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SUMMARY OF RECENT ABSTRACTS*

VI. PLAGUE †

General: Reservoir Hosts: Transmission

In the Proceedings of the Symposium on Plague, held at the Haffkine Institute in 1959 (p. 1261), several papers are published on experimental respiratory plague, on *Pasteurella pestis*, and on immunity. These should be read in full. In an account of the conquest of plague in India SEAL made the point that wild rodents do not play a very convincing role there. GIRARD (p. 365) discusses the influence of climatic conditions on the incidence of plague. The activity of the flea is determined predominantly by temperature, and an important factor is the ability of the flea to live away from its host.

YUNKER *et al.* (p. 241) made an expedition to Asyut, Egypt, which was once a focus of plague, and collected various fleas, mites and lice from rodents trapped in the area. They give an account of the species found, as a background to the investigation of plague.

GRAINGER *et al.* (p. 29) found *P. pestis* (var. *antiqua*) in the common rodent (*Otomys angoniensis*) of part of Kenya where a small outbreak of human plague occurred, and in the flea *Dinopsyllus lypusus*. Various other rodents and fleas were captured and examined but were negative. Wild rodents are probably the permanent reservoir hosts of plague in East Africa, but this has not yet been proved, and it is not known whether *Rattus rattus* can act in that way. The outbreak was controlled by using DDT dusting powder. HEISCH (p. 366), however, has already shown that wild rodents are the permanent reservoir of plague in Kenya; they are resistant and may harbour *P. pestis* without signs of disease. It is not certainly known if *R. rattus* can be a permanent reservoir —it is very susceptible and the infection soon dies out, but it may develop resistance and inapparent infection. The author suggests that this question

* The information from which this series of summaries has been compiled is given in the abstracts which have appeared in the *Tropical Diseases Bulletin*, 1960, v. 57. References to the abstracts are given under the names of the authors quoted and the pages on which the abstracts are printed.

† For previous articles on plague in this series, see the July issues of the *Tropical Diseases Bulletin* each year since 1939.

needs to be investigated, especially by attempting to isolate *P. pestis* from rats and fleas in interepizootic periods, and by using pooling techniques.

MISONNE (p. 365) remarks that plague is endemic in 2 foci in the Congo. Most human cases are recorded between May and October, but there may be cases at any season. Infections of rodents and fleas have also been recorded throughout the year. 2 domestic rodents have restricted habitats round the houses, but in addition there are 3 peri-domestic species which may enter houses at night. These may act as intermediaries between domestic and wild rodents, but in the dry season the rodents tend to collect in humid areas, and transmission is interrupted, to begin again in the rains.

BRYGOO and RAJENISON (p. 367) describe the fleas taken on rats in Tananarive.

QUAN *et al.* (p. 805) give an account of their finding of *P. pestis* in 5 species of fleas taken on field mice in California, of which the most important were *Malaraeus telchinum* and *Hystrichopsylla linsdalei.* There was an epizootic of plague in field mice which lasted about 6 weeks in February–April 1954; the dominant rodent, *Microtus californicus,* was mostly resistant to plague, but sucklings were susceptible. Faeces from infected fleas were not always infected; apparently typical bacillary masses could sometimes be seen in uninfected fleas; infected fleas did not always have detachable bacillary masses in the proventriculus or gut. The epizootic was localized, probably because the range of movement of the field mice was very short, but it did apparently spread to a rat and fleas on a hog farm, where it was controlled by prompt measures against rats. Plague has been proved to exist in wild animals and their fleas in Utah, though positive findings have been rare; STARK (p. 31) gives a comprehensive account of the fleas of the area, and their host-associations, with information on medical implications. PARKER and HOWELL (p. 592) report a survey of fleas and their hosts (mammals and birds) in the Great Salt Lake Desert.

COVA GARCÍA and TALLAFERRO (p. 367) give a list of the common fleas of Venezuela, with a key and a list of hosts.

JERVIS ALARCÓN (p. 30) discusses plague in Ecuador, where it is endemic in rural inland mountainous country, but where it has also been associated with towns on the coast and along railway lines.

In part of China (Chilin) TSOW *et al.* (p. 240) isolated *P. pestis* from *Dermacentor* ticks taken from *Citellus dauricus* infected with plague, and from *Dermacentor* and *Haemaphysalis* taken from healthy *Citellus.*

Aetiology: Immunization: Control

P. pestis can be stored in the frozen state for long periods without much loss of virulence or viability, but MEAD *et al.* (p. 1056) show that at + 5°C. virulence begins to be lost after 4 weeks. The mechanism of this loss is not understood but there is probably a physiological change.

BROWNLOW and WESSMAN (p. 1057), in a study of the nutritional requirements of *P. pestis,* note that a chemically defined medium which was satisfactory for optimal growth at 28°C. was inadequate at higher temperatures. Some strains needed additional amino acids. DODIN and BRYGOO (p. 31) give an account of the utilization of rhamnose and glucose by the EV strain of *P. pestis.* SMITH and HIGUCHI (p. 1057) observed that D-serine can prevent the growth of *P. pestis* at a concentration of about 1 mM, but that L-serine does not do so. The action of D-serine, which can be reversed by several amino acids, is probably to block the entry of glycine into purines and other compounds.

CAVANAUGH and RANDALL (p. 119) show that virulent *P. pestis* multiplying rapidly in the stomach of the fleas have no detectable Fraction I (envelope) antigen, and that large numbers can be phagocytosed and destroyed by polymorphonuclear leucocytes in experimental animals; there are, however, others which are phagocytosed by monocytes, and these are not destroyed but multiply intracellularly, and when released are found to have developed resistance to both polymorphs and monocytes and to be well encapsulated and rich in Fraction I. The infectivity of a feed regurgitated from a flea appears to depend on the concentration of *P. pestis* rich in Fraction I, and consequently resistant to phagocytosis.

Fraction I of *P. pestis* is the soluble antigen liberated into the culture medium, and WINTER and MOODY (p. 120) found that antisera could be produced by using this Fraction or (especially) whole cells of strains which produced much of it. The antibody could be made fluorescent by appropriate technique, and could then be used satisfactorily for the identification of *P. pestis* in smears from cultures (if fixed by heat) or from the organs of infected animals. This method permitted identification earlier than by the usual method of culture and agglutination. By the agar gel diffusion technique LAWTON *et al.* (p. 1057) identified several antigens specific for *P. pestis* and others specific for *P. pseudotuberculosis*. A commercial anti-plague vaccine, a vaccine against Fraction I, and the attenuated EV vaccine all protected guineapigs against plague and against Fraction I, but a killed *P. pseudotuberculosis* vaccine did not. Inoculation of purified L antigen did not protect against *P. pestis*. In sera from immunized animals there was a correlation between specific circulating antibodies, anti-L factors and immunity to pneumonic plague.

ARONSON and BICHOWSKY-SLOMNICKI (p. 1166) report observations on changes in electrophoretic mobility of *P. pestis* at different temperatures and *p*H levels. There was no evidence of correlation between change in mobility and the ability to synthesize the VW antigen fractions or Fraction I.

PACKER *et al.* (p. 591) show that purified plague toxin inhibits the respiration of heart mitochondria from the toxin-sensitive rat and mouse, but not from the toxin-resistant rabbit; the inhibition is specific. Heat treatment abolishes the toxicity and also the inhibitory power of the toxin.

WAKE (p. 240) describes a variant colony form of *P. pestis* which appears to be new. It is a smooth, whitish, opaque colony with a regular edge; the organisms are coccoid and are completely non-virulent and non-protective. They lack Fraction I antigen. This form has been isolated from animals which have survived a challenge of typical virulent *P. pestis*.

DZHAPARIDZE and SIDOROVA (p. 591) discuss the changes in citric acid content of the tissues of white mice brought about by infection with plague; the account should be read in full.

From animal experiments POKROVSKAIA *et al.* (p. 592) conclude that immunization of guineapigs with living non-virulent *P. pestis* by injection and also by inhalation leads to more effective resistance to pneumonic plague than immunization by injection alone. Inhalation leads to a more pronounced pulmonary macrophage reaction, and the authors relate the whole process of immunization to the glycogen or polysaccharide content of neutrophil polymorphs or macrophages, and the transfer and utilization of glycogen by these cells.

In work on anti-plague serum KOTLIAROVA (p. 1058) reports that the gamma globulin fraction afforded some protection when injected before or at a time of

challenge; the beta fraction gave less protection, and the alpha fraction none.

KARTMAN (p. 806) shows that the technique of using DDT in bait boxes for *Microtus californicus* has continued to be successful in controlling their fleas, and that there has been no evidence of the development of resistance to DDT. It is not certain, though possible, that DDT may have controlled the rodents also. HARVEY (p. 807) and BENNINGTON (p. 807) both experimented on the addition of a systemic insecticide to the diet of rats, and the effect of this on the rat fleas. There was some evidence that the fleas could be controlled at suitable dosage; details should be sought in the original. *Charles Wilcocks*

MALARIA

In this section abstracts are arranged as far as possible in the following order:—Human malaria—*epidemiology, aetiology, transmission, pathology, diagnosis, clinical findings, treatment, control;* Animal malaria—*monkeys, other animals, birds.*

GALLIARD, H. & HO-THI-SANG. Indices plasmodiques dans la région du Tchad: Fort-Lamy et Moyen-Chari (Fort-Archambault). [**Malaria Parasite Rates in the Tchad Region**] *Bull. Soc. Path. Exot.* 1960, Sept.–Oct., v. 53, No. 5, 789–91.

The authors state that the aim of these investigations was to discover whether a clearer epidemiological picture might not be obtained by limiting the number of blood films taken and subjecting each one to prolonged examination. In 100 slides taken in Middle-Chari at the end of the dry season, a first rapid examination gave a parasite rate of 40%; on re-examination this was raised to 100%. The trophozoites found were all older forms; young trophozoites were not seen.

[Although parasite rates ranging from 19·51% to 47·5% are then quoted for 5 other areas, there is no further comparison of rapid with prolonged examination. These rates all seem to be based on the prolonged examination of small numbers of films, each film having been examined for at least an hour. No other details of technique are given, the speed of the "rapid" examination is not stated, nor do the authors explain whether they were using thick films or thin films.]

T. Wilson

SICART, M. & RUFFIE, J. Sur les larves d'Anophèles récoltées en Corse au cours de l'été 1959. [**Anopheline Larvae collected in Corsica in the Summer of 1959**] *Ann. Parasit. Humaine et Comparée.* 1960, July–Sept., v. 35, No. 4, 622–30, 1 graph & 3 charts.

The authors collected 4,346 anopheline larvae in Corsica during 1959 belonging to 5 species, *Anopheles marteri, A. algeriensis, A. claviger, A. maculipennis* and *A. labranchiae.* Notes are given on the various forms and varieties of these species and these provide evidence of possible colonization from North Africa. [For a history of antimalarial control measures in Corsica, see this *Bulletin,* 1960, v. 57, 1012.] *B. R. Laurence*

AL-DABAGH, M. **Mechanisms of Death and Tissue Injury in Malaria. VIII. Heart Failure.** *J. Facul. of Med., Baghdad.* 1961, Jan., v. 3 (n.s.), No. 1, 37–8. [10 refs.]

See also p. 865, SHUTE & MARYON, **A Satisfactory Technique for Storing and Staining Malaria and other Parasites in Old Blood Films.**

FLORIS, E. & ONNIS, C. Considerazioni su tre casi di malaria. [**Observations on Three Cases of Malaria in Sardinia**] *Riv. di Malariologia.* 1960, Dec., v. 39, Nos. 4/6, 237–43, 1 graph. English summary (6 lines).

The authors describe 3 clinical cases of malaria, presumably from infections contracted in Sardinia, despite the fact that the main vector in the island, *Anopheles labranchiae*, has now become extremely rare. The authors are inclined to consider the infections as relapses, but they might also be due to blood transfusions to which all 3 patients had been submitted. *Philip Manson-Bahr*

PETERS, W. **Drugs against Malaria. (Notes for the Guidance of Medical Personnel in the Territory of Papua and New Guinea.)** 30 pp., 5 figs. 1960. Port Moresby: Malaria Section, Dept. of Public Health, Territory of Papua & New Guinea.

These notes aim to explain in simple language the life history of the malaria parasite and the mode of action of anti-malaria drugs, in addition to recommending the doses of drugs to be used in various circumstances.

Sections on the life cycle of the parasites and on the build-up of immunity in a highly endemic area are illustrated by diagrams. Other sections describe the drugs available, explain their action on the different stages of the parasites, and give the doses recommended in prophylaxis and treatment. Advice is given on how to deal with epidemic malaria, with malaria in seriously ill patients, with blackwater fever, and on the radical cure of *Plasmodium vivax* infections. The diagnosis of malaria should be based on the examination of blood films. Instructions are also given on the treatment of acute poisoning due to idiosyncrasy or overdose and there are detailed recommendations for the benefit of Infant and Maternal Welfare Staff on the treatment of various categories of malaria patients. Books for more advanced reading are recommended.

[The medically unqualified staff for whom these notes are intended may derive some benefit from them. Others will note several factual errors, and will query some of the opinions expressed and a number of the recommendations made.]

T. Wilson

LAMBERT, C. Notes sur le traitement de la malaria cérébrale algide de l'adulte. [**Notes on the Treatment of Algid Cerebral Malaria in Adults.**] [Miscellanea.] *Acta Tropica.* Basle. 1961, v. 18, No. 1, 71–7. [13 refs.]

During the period 1954–1959, in the hospital of Lubudi in the Congo, the author studied and treated 17 cases of cerebral malaria in adults, that is in

patients from 15–40 years of age. Mild cases were excluded. Infection with *Plasmodium falciparum* was confirmed in all cases.

He describes the clinical picture, partly in these cases, and partly from the literature, and discusses the diagnosis. He summarizes the generally held views on the pathology, and from this he derives a logical view as to treatment: that in addition to antimalarial drugs treatment should combat collapse, improve the cerebral circulation where it tends to be held up in the capillaries, and correct dehydration and anoxaemia. He therefore uses glucose saline infusions with 500 mgm. of quinine in 500 ml. given twice or thrice in the 24 hours. To each infusion he adds 25 mgm. hydrocortisone. To extremely collapsed patients he would also give noradrenaline infusions simultaneously in the other arm.

His first 10 patients were treated without steroids or noradrenaline, and of these 3 died. None of the 7 later patients given the full treatment were lost.

[While this is an interesting exposition of views on and methods of treating cerebral malaria it does not introduce any new ideas.] *A. C. E. Cole*

RAFFAELE, G. Importance des porteurs de parasites dans l'eradication du paludisme. **[Importance of Parasite Carriers in the Eradication of Malaria]** *Riv. di Malariologia.* 1960, Dec., v. 39, Nos. 4/6, 201–7.

The author is of the opinion that, in those countries where malaria eradication is being undertaken, treatment should be limited to those patients with fever and with parasites in their blood. Treatment is best carried out with chloroquine or amodiaquine, 600–900 mgm. (base) on the first day and 300 mgm. during the 2–3 following days. The search for healthy malaria carriers is a time-consuming task considering that the results are so meagre. Chemoprophylaxis is inadvisable under these conditions, because it also conceals clinical cases and therefore interferes with the possibility of obtaining a reliable assessment of interruption of transmission. *Philip Manson-Bahr*

CHARLES, L. J. **Observations on the Haemolytic Effect of Primaquine in 100 Ghanaian Children.** *Ann. Trop. Med. & Parasit.* 1960, Dec., v. 54, No. 4, 460–70. [24 refs.]

The success of malarial eradication schemes in Africa is hampered by the high rate of transmission, and might be improved by the use of gametocytocidal drugs, especially during the "consolidation phase". But the 8-aminoquinolines, despite their efficacy, might be thought dangerous in a population containing many primaquine-sensitive persons. However, reports on the use of pamaquin or primaquine in various parts of Africa have mentioned few or no incidents of haemolysis.

100 children infected with *Plasmodium falciparum* were treated with Camoprim Infantabs (amodiaquine 75 mgm. base, with primaquine diphosphate equivalent to 15 mgm. base) for 5 weeks, the dose being adjusted so that each received the equivalent, weekly, of about 1·0 mgm. of primaquine base per kgm. of body weight. 30 controls received ascorbic acid as a placebo. In the treated group, all asexual parasites were cleared from the blood in a week and all gametocytes, originally present in 34 of the patients, had permanently disappeared by

the end of the second week. Weekly haematological examinations showed no evidence of haemolysis in any child.

The erythrocytes of 34 of the treated, and of all 30 control children, were tested for glucose-6-phosphate dehydrogenase (G6PD) deficiency, and 8 positive results were recorded in each group. A comparison between these affected children (8 treated and 8 controls), made at weekly intervals for 5 weeks, did not demonstrate any recession of the haemoglobin level in the treated group.

Small doses of primaquine (3 or 5 mgm. daily, or a single dose of 30 mgm.) have been shown to interrupt the sporogony of *P. falciparum* [this *Bulletin*, 1960, v. 57, 783] and other experience is quoted to show that the dose of primaquine necessary to induce haemolysis in susceptible subjects is above the therapeutic dose for malaria [see, for example, *ibid.*, 1961, v. 58, 167]. Hence the presence of primaquine sensitivity in an African population need not discourage the use of the drug when it might assist in consolidating malarial eradication.

Alan B. Raper

McGregor, I. A. **Demographic Effects of Malaria with special reference to the Stable Malaria of Africa.** *West African Med. J.* 1960, Dec., v. 9 (n.s.), No. 6, 260–65. [32 refs.]

From a study of the literature relating to this subject and from his own observations in the Gambia, the author concludes that persons subject to the impact of stable malaria in Africa pass through 5 successive stages. Stages 1 represents the period of relative insusceptibility where inherited immunity appears to reinforce some transient malariostatic phenomenon, *e.g.* foetal haemoglobin, to give freedom from parasitaemia. Stage 2 represents the primary attack, in which inherited immunity mitigates the clinical effects but does not suppress parasitaemia. Stage 3 coincides with the trough of host immunity; inherited antibodies have been exhausted and actively acquired ones have not yet been produced in effective quantity. Stage 4 represents the acquisition of the first phase of active immunity, and is characterized by a rapid decline in the severity and frequency of clinical illness despite the persistence of relatively dense parasitaemia. The fifth and final stage is reached when antiparasitic immunity is achieved and parasitaemia drops to a very low level.

In areas of unstable malaria, control or eradication is likely to be followed by considerable improvement in the health of people in all age-groups. This, by enhancing productivity, may in turn so improve the economy of the area that at least part of the cost of the antimalarial measures may be recovered. A decrease in death rates of children and adults will become obvious and the rates of abortion, stillbirth and neonatal mortality will be reduced.

In areas of stable malaria the benefits of eradication will be most apparent in the young age-groups. The incidence of prematurity may decline, neonatal mortality may be reduced, infant mortality and death rates in young children will be lowered and the health of infants and children will be substantially improved. The health and physical fitness of the adults are not likely to improve materially and consequently no marked economic advance can be expected. Highly successful control will produce effects similar to eradication, but poor control may, by decreasing the frequency of infective inoculation and consequently communal immunity, bring about a state where adults as well as children suffer from the ravages of the disease.

It is concluded that wherever malaria exists as an important disease, eradication or successful control measures will eventually produce a substantial increase in population, a state of affairs which will inevitably be attended by specific and urgent problems. *G. Covell*

CLYDE, D. F. **Malaria Control in Tanganyika under the German Administration. Part I.** *East African Med. J.* 1961, Jan., v. 38, No. 1, 27–42.

This account of early attempts to control malaria in the territory formerly known as German East Africa (now Tanganyika) is full of interest and richly repays the labour entailed in its compilation. The story begins in January 1889, when Bismarck appointed Major von Wissmann to be Imperial Commissioner for the colony, with a mixed force including Sudanese, Zulu and a few Syrian troops. The medical unit at first consisted of 2 doctors and 4 medical orderlies and the sick were evacuated to one of the 2 German hospitals in Zanzibar. The first permanent general hospital on the mainland was established at Bagamoyo, then the principal trade outlet of the colony. In 1891 Dar es Salaam was selected as the seat of government, and later hospitals for Europeans and for Africans and Asians were established there and at Tanga. From the outset malaria was by far the most serious medical problem.

In 1895 there arrived in Tanganyika 3 persons destined to play a prominent part in the fight against malaria. These were Dr. Plehn, who studied the effects of the disease on the population of Tanga; Staff Surgeon Ollwig, who undertook a large-scale treatment campaign in Dar es Salaam under the guidance of Robert Koch; and the chemist Giemsa, who devised chemical methods for the destruction of mosquitoes and developed staining techniques for the diagnosis of the malaria parasite. In 1897 Koch investigated an epidemic in the Western Usambara mountains, which he incriminated as being due to infection with *Plasmodium falciparum.*

The investigations by Plehn and Koch of the incidence of malaria among the different races in Tanganyika formed the basis for a detailed study of malarial immunity, which was carried out by Dr. Otto Panse, who became government medical officer in Tanga in 1898. As the result of blood examinations of people of different age-groups, which showed progressively fewer parasites as age advanced, he concluded that because the African children suffer from sickness all the year long their bodies develop strong defences so that parasites can no longer live in their blood. And this is proved by the fact that when an adult African, born and brought up in a malaria-free district, comes for the first time to a malarious district, he goes down with fever. He did not agree however with those who claimed that the African should be left unprotected from malaria except by his immunity. "We may not be able to do much about it yet, but the day will come when we can, and then he must be protected from a disease which causes him repeated illness whilst he is attempting to gain this immunity."

In Dar es Salaam Dr. Ollwig, prompted by Koch, had begun mass treatment with quinine in an attempt to control malaria in the town. This method was extended to Tanga in 1905 under the direction of Panse, and was continued by his successors over the ensuing 8 years, but the results were never satisfactory. In 1913 Dr. Manteufel recommended that malaria in Tanga should thenceforward be controlled by measures directed against the mosquito, mainly the drainage of

certain swampy areas within the town. In the end little was done, however, because of the outbreak of the First World War in August 1914. *G. Covell*

CLYDE, D. F. **Malaria Control in Tanganyika under the German Administration. Part II. Mass Chemoprophylaxis in Dar es Salaam.** *East African Med. J.* 1961, Feb., v. 38, No. 2, 69–82, 2 figs. [10 refs.]

In 1897 Robert Koch visited Dar es Salaam and advocated mass treatment of the population with quinine as an antimalarial measure. The proposal was put into effect towards the end of 1901, under the direction of Dr. Heinrich Ollwig, a military staff surgeon. In 1905 a similar campaign was inaugurated in Tanga by Dr. Panse.

The application of mass treatment was rendered difficult by the apathy of the semi-immune African population, in whom malaria caused little disability. Among the Indian community difficulty was at first encountered in administering the drug to women and children living under the purdah system, while Europeans were unwilling to allow their employees to attend treatment parades because this was likely to be used as an excuse for prolonged absenteeism. The greatest problem encountered, however, was the constant movement of population and the intermittent advent of infected persons into the caravan porters' camp.

The campaign was conducted with commendable vigour, the town being divided into 22 zones for distribution purposes. At first the quinine was administered by domiciliary visits, but this proved impracticable owing to shortage of staff, and was replaced by the establishment of treatment centres in the various zones.

The dosage of quinine first adopted was 1 gramme every 9th and 10th day over a period of 2 months to all persons found infected, but this period proved insufficient and was extended to 2½ months for *Plasmodium falciparum* malaria and 3 months for other types of malaria. Later, the regimen was again altered, the drug being given on the 10th, 11th and 12th days with an intermission of 9 days. It is estimated that this dosage of 3 gm. every 10 days was nearly 5 times that actually required for the partially immune African, but only three-quarters of that required for non-immunes. However, Ollwig reported only one-half per cent. failure.

Ollwig retired in 1903 and was succeeded by Dr. Hugo Meixner, who continued to conduct the campaign in Dar es Salaam up to the outbreak of the First World War in 1914. For a variety of reasons it proved extremely difficult to assess the results achieved, but the campaign certainly failed to provide the good results that had been expected. The percentage of morbidity from malaria fell from 45 in 1903 to 30 in 1907, but thereafter there was very little further improvement in the figures. In 1913 Dr. A. J. Orenstein, well known for his work on malaria control during the construction of the Panama Canal, reported adversely on the Dar es Salaam campaign and rejected it in favour of antimosquito works. A continuation of mass treatment had, however, been planned for 1914–15, but this was brought to a close by the outbreak of the First World War.

In a postcript to this most interesting paper just tribute is paid to the notable contribution of German workers in Tanganyika to our knowledge of the epidemiology and treatment of malaria. *G. Covell*

De Zulueta, J., Kafuko, G. W., Cullen, J. R. & Pedersen, C. K. **The Results of the First Year of a Malaria Eradication Pilot Project in Northern Kigezi (Uganda).** *East African Med. J.* 1961, Jan., v. 38, No. 1, 1–26. [14 refs.]

The district in which this operation is being conducted forms part of the Great Western Rift Valley, which includes in Uganda the basins of Lakes Edward and Albert. The population protected was about 60,000.

Preliminary surveys showed that malaria was hyperendemic between the shore of Lake Edward (2,995 ft. above sea level) and approximately the 3,700 ft. contour line. Between this level and the 4,500 ft. contour line malaria was mesoendemic. At about 4,500 ft. transmission ceases. In the endemic areas malaria transmission is perennial. The chief insect vector is *Anopheles gambiae*, though *A. funestus* was also found in a small area near Lake Edward.

Very thorough spraying with DDT was carried out every 4 months in the hyperendemic section and every 6 months in the mesoendemic section, at a dosage of 2 gm. of technical DDT per square metre. All the inner surfaces of dwellings were sprayed as well as windows, doors and eaves on the outside. Spraying was supplemented by single-dose treatment with chloroquine-pyrimethamine (adult dose 600 mgm. of chloroquine base plus 50 mgm. of pyrimethamine). Cooperation of the local inhabitants was remarkably good and no single dwelling was left unsprayed on account of refusal or absence of the owner.

The overall spleen and parasite rates before spraying were 39·3% and 16·6% respectively. After 10–12 months of DDT protection these had fallen to 10·7% and 0·3% respectively. Transmission as judged by the infant parasite rate was completely interrupted and indoor vector densities were reduced almost to nil.

The success of the campaign is attributed to total coverage, which can only be obtained through much personal exertion of the spray men and their supervisors and the complete cooperation of all the local population, from the chiefs down to the inhabitants of the most remote corners of the protected area. [No mention is made of the dynamic personality of the Project Leader, which was perhaps the most important factor of all.]

The authors believe that malaria can be eradicated from this area within a short time, and that the eradication of malaria from Central and Western Uganda is also feasible.

Results are shown in great detail in 13 tables. *G. Covell*

França, J. B. M., Dias, J., Jr. & Reis, U. L. Saneamento rural e erradicação da malária. [**The Improvement of Rural Sanitation and Malaria Eradication**] *Arquivos de Hig. e Saúde Pública.* São Paulo. 1960, Dec., v. 25, No. 86, 245–60, 4 maps & 2 graphs. [14 refs.]

This paper is by three engineers of the Malaria and Chagas's Disease Eradication Service in São Paulo and must be regarded really as a preliminary report.

The State has an area of 275,000 sq. km. with a population of about 12 million. Topographically it has a coastal strip and a plateau area about 400–600 metres above sea level, separated by a mountain range. The average winter temperature is 18°C. Heavy rains occur in the six months from September to March, and less

often from April to August, so, there being large rivers also, the climate favours the occurrence of malaria.

30 species of anophelines are found in the State, the 5 recognized vectors being *A. darlingi*—principally in the plateau, *A. aquasalis*—in the littoral, *A. albitarsis domesticus*—restricted to 2 towns in the littoral, *A. cruzii* breeding in the bromeliads in the mountain area, and *A. bellator*—rarely met with above 200 m. *Plasmodium vivax* forms about 99% of all infections, though *P. falciparum* and *P. malariae* are also met with.

Up to 1946 malaria was extensively present especially in the littoral and along the lines of the great river basins, but by 1958 after 12 years of DDT spraying the malarial area had been reduced by 80% so that a campaign for its complete eradication from the State was drawn up in that year, the resources of the State, the country, and also the United States Point IV programme being used.

The campaign was to be in 3 stages: (a) preliminary—already completed; (b) attack, now in progress, by DDT spraying of all houses at half-year intervals for 4 years; (c) surveillance, starting at the end of stage (b), and lasting probably for 3 years, depending on the progress of the programme for the rest of the country.

Stage (b) was started in February 1960 with 98 mobile units. The State was divided into 8 zones and spraying was carried out, at the rate of 2 gm./sq. m., with DDT as a 75% wettable powder or a 5% solution in kerosene, or as a 20% watery emulsion. At the same time cases of malaria were investigated, as were possible vectors, resistance to insecticides, and extensive education of all concerned.

By the end of May over 300,000 houses had been treated out of a total of 476,000 liable to be dealt with.

The service also deals with the destruction of reduviid bugs as the vectors of Chagas's disease, the 2 principal being *Triatoma infestans* and *T. sordida*. For the destruction of both *Anopheles* and reduviids a mixture of DDT 75% and BHC 50% as a wettable powder is used, while for Chagas's disease alone BHC 30% as a powder is used.

[The complete eradication of malaria from even São Paulo State will be an enormous task. It will be of interest to have another report of the progress in a year or so.] *W. K. Dunscombe*

EYLES, D. E. **The Exoerythrocytic Cycle of** *Plasmodium cynomolgi* **and** *P. cynomolgi bastianellii* **in the Rhesus Monkey.** *Amer. J. Trop. Med. & Hyg.* 1960, Nov., v. 9, No. 6, 543–55, 15 coloured figs. on 2 pls. [12 refs.]

It will be recalled that some American workers [*e.g.*, HUFF, this *Bulletin*, 1950, v. 47, 1168] were not convinced of the validity of the findings of SHORTT and GARNHAM [*ibid*, 1948, v. 45, 388] regarding the liver phases of malaria parasites. The present author disposes of some of these criticisms by describing in detail his own experiments with *Plasmodium cynomolgi cynomolgi* and *P. c. bastianellii* [*ibid*., 1960, v. 57, 1244], in rhesus monkeys, using *Anopheles quadrimaculatus* or *A. freeborni* as the transmitting agents. The liver biopsy material was fixed in Carnoy's fluid and stained with Giemsa stain.

Sections of material (liver) were examined from: (1) 5 uninfected monkeys; (2) 3 monkeys which had received uninfected mosquito tissues; (3) a monkey

which had been bitten by infected mosquitoes; (4) monkeys which had been inoculated intravenously with sporozoites. No tissue forms were discovered in the first two groups; a single pre-erythrocytic schizont was seen in the third group (after infective bites); many tissue schizonts were found in the fourth group (in all of 24 monkeys) and at an approximate density 30 times as great as in the preceding group (infective bites). Tissue stages were found from the 5th to the 120th day after inoculation. The 5th day form in *P. cynomolgi cynomolgi* measured 12 μ in diameter, in *P. bastianellii* 16 μ; the 7th day forms were 29 μ and 31 μ. The prepatent period ends with *bastianellii* on the 7th day and with the type form on the 8th. [Such differences formed the chief basis for the creation of the subspecies—*loc. cit.*] Polymorphism of the nuclei is a marked feature of the schizont from the earliest stages, which are clearly located in the parenchyma cells. Vacuoles were found in the cytoplasm of some though not all of the 8th day type form schizonts. Later the *P. bastianellii* schizonts tended to be smaller than those of the type form, and on the 9th day for instance were round or oval (43 μ in diameter) instead of being much lobed (50 μ). Parasites were only occasionally found several months after infection, and it is possible that these forms represent dormant or slowly growing parasites rather than second or later generations.

These results confirm the original work, while the observations on monkeys inoculated with uninfected material were further confirmed by finding typical pre-erythrocytic schizonts in the same monkeys subsequently inoculated with sporozoites. The Feulgen technique showed that the nuclei of 7th and 8th day schizonts of the two strains contained deoxyribonucleic acid.

This interesting paper is well illustrated by 15 good coloured photomicrographs. *P. C. C. Garnham*

PAYAN, H., SAUTET, J. & ALDIGHIERI, J. R. Contribution à l'étude anatomopathologique de l'infection à *Plasmodium berghei*, chez les souris blanches soumises à divers régimes. [**Pathology of** *Plasmodium berghei* **Infections in White Mice on Different Dietary Régimes**] *Ann. Parasit. Humaine et Comparée*. 1960, Apr.–June, v. 35, No. 3, 209–20, 3 figs.

The authors had previously noticed that the addition of pure vitamins A and D to the diet of white mice suffering from *Plasmodium berghei* malaria enabled these animals to withstand the infection better than if the vitamins were given in the form of cod-liver oil. Experiments were devised to see if the adverse effects of the latter were due to the fat content accelerating the fatty degeneration of the organs, known to occur during the course of the disease. 2 groups of mice were given chloroquine (9·2 mgm. per kgm. for 5 days) 2 days after inoculation and were placed on the diet 5 days before inoculation of a standard dose of parasites. The first group of mice were given cod-liver oil on alternate days, the second every day. A control group were fed on bread and water alone.

The histological examination of the liver and spleen showed that 5 out of 11 animals on cod-liver oil showed greater or lesser degeneration of the liver parenchyma, and 3 out of 10 on the ordinary diet; the differences were inconstant and insignificant. On the other hand, the Kupffer cells were markedly hyperplasic and pigmented, particularly if the infection ran a long course, while the red pulp of the spleen was greatly congested in the earlier stages of the infection.

P. C. C. Garnham

ALDIGHIERI, J., ALDIGHIERI, R., RAMPAL, C. & RAMPAL, C. Les effets brusques de la compression et de la dépression peuvent-ils influer sur l'évolution des infections à *Plasmodium berghei* chez la souris blanche? [**Can the sudden Effect of Compression and Decompression affect the Course of** *Plasmodium berghei* **Infections in White Mice?**] *Bull. Soc. Path Exot.* 1960, Mar.–Apr., v. 53, No. 2, 279–93, 9 charts & 2 figs.

White mice in two phases of *Plasmodium berghei* malaria (acute and latent) were exposed either to compressed air (equivalent to a depth of 20 or 30 metres of water) or to a rarified atmosphere (equivalent to a height of 5,000–6,000 m.). Both these stresses were thought to correspond to conditions under which man often finds himself today—either in underwater swimming or in flying. Alterations in pressure failed to affect mice with latent infections and no relapses occurred. Mice were exposed to pressure effect 4 hours and 6 days after inoculation, and the course of infection was compared with control mice in which the average day of death was 10. The " 4-hour " mice suffered a more intense, the " 6-day " a rather less, infection after exposure to compression, but the former was thought to be due to too sudden return to normal pressure, *i.e.*, it was an accidental effect rather than one due directly to the high atmospheric pressure. A low pressure caused no significant change in the parasitaemia or mortality.

P. C. C. Garnham

CAUSSÉ-VAILLS, C., ORFILA, J. & FABIANI, M. G. Fractionnement électrophorétique des protéines et pouvoir protecteur du sérum du rat blanc immunisé contre *Plasmodium berghei*. [**Electrophoretic Fractionation of Proteins and Protecting Capacity of White Rats' Serum after Immunization against** *Plasmodium berghei*] *Ann. Inst. Pasteur.* 1961, Feb., v. 100, No. 2, 232–42, 6 figs.

Rats were immunized against *Plasmodium berghei* and their serum was analysed by electrophoresis to determine in which fraction the antibodies had been formed. The protecting antibodies were bound to beta and gamma globulins and were absent in the albumin and alpha globulin fractions. *H. Lehmann*

MCGHEE, R. B. **An Auto-Immune Reaction produced in Ducklings in Response to Injections of Duck Embryo Blood infected with** *Plasmodium lophurae*. *J. Infect. Dis.* 1960, Nov.–Dec., v. 107, No. 3, 410–18, 6 figs. [14 refs.]

The possibility that in malaria infections auto-immune reactions may occur as the result of the effect of the parasite on host red cells has been considered by a number of authors [this *Bulletin*, 1945, v. 42, 353; 1946, v. 43, 632; *Quart Bull. Northwestern Univ. Med. School*, 1947, v. 21, 52]. McGhee has found that injection of duck embryo red cells infected with *Plasmodium lophurae* gave rise to a reaction by the duckling host which caused marked eradication of polychromatophil erythroblasts. This observation has now been further investigated to find if an auto-immune response was elicited by the host against its own immature red cells as well as against heterologous cells.

The strain of *P. lophurae* was maintained in duck and chick embryos and in young ducks. When day-old ducklings were infected intravenously from embryos parasitaemia increased until the 5th day but when inoculation was made subcutaneously the course of parasitaemia was more varied and less heavy but anaemia was nevertheless severe. Various possibilities were considered as a cause of this anaemia, including the presence of a virus, but this was not confirmed. It appeared that injection of heterologous red cells infected with *P. lophurae* into the duckling might be producing an immune response against the host's immature red cells, and the author considers this phenomenon to be due to auto-antibody action. It is still not understood why infected duck embryo erythrocytes serve as better antigens than those of the duckling. The nature of the antibody whether lysin or agglutinin has not been determined. Parasites from duck embryo red cells when frozen and thawed produced anaemia in absence of parasitaemia but they proved less antigenic than living parasites and red cells.

The author draws attention to the work of ZUCKERMAN [this *Bulletin*, 1960, v. 57, 1145] who demonstrated the presence of an auto-immune reaction in rats with *P. berghei* which is in agreement with the present findings.

J. D. Fulton

MEYER, H. & MUSACCHIO, M. de O. **Electron Microscope Study of the Exoerythrocytic Form of *Plasmodium gallinaceum* in Thin Sections of Infected Tissue Cultures.** *J. Protozoology.* Utica. 1960, Aug., v. 7, No. 3, 222–8, 10 figs. [16 refs.]

A description is given of the structure of exo-erythrocytic stages of *Plasmodium gallinaceum* grown in culture of chick embryo heart muscle and examined by electron microscopy. As shown in the micrographs illustrating the paper, important structural changes take place in the course of the developmental cycle of the tissue phase of the parasite. The merozoites have a large central nucleus and an electron-dense oval body at one pole, while their cytoplasm shows fine granulation, as well as canaliculi, but no mitochondria. Within the cytoplasm of the schizonts there are small scattered particles; their nuclei are indistinct, and the oval body is absent. As in merozoites, canaliculi are present but no mitochondria. In the segmenter the developing merozoites are arranged in the form of a rosette, connected with a central core which is of low electron density and contains canaliculi and small particles. The entire segmenter is enclosed in a vacuole-like space invested in a membrane.

C. A. Hoare

WEATHERSBY, A. B. **Experimental Infection of *Aedes aegypti* with Exoerythrocytic Stages of *Plasmodium gallinaceum*.** *Exper. Parasit.* New York. 1960, June, v. 9, No. 3, 334–7. [10 refs.]

A laboratory strain of *Aedes aegypti*, highly susceptible to *Plasmodium gallinaceum*, was used for the intrahaemocoele injection of a suspension of embryonic chick brain containing many exo-erythrocytic forms of the parasite; the mosquitoes were kept at 80°F. and at a relative humidity of 70%. They were fed on clean chicks from the 3rd to the 7th day after the inoculation (when up

to 50% remained alive). 52 batches of mosquitoes were used and 15 batches (29%) infected the chickens (5 after 3 days, 3 after 4 days, 2 after 5 days, 3 after 6 days and 2 after 7 days), giving rise to very mild infections with prepatent periods ranging from 2 to 20 days. This extremely interesting result is stated by the author to have two possible explanations: (1), a retrograde development of the EE schizonts leading to "sporozoite" forms and (2), merozoites escaping from the EE schizonts, invading the salivary glands and infecting the new birds *via* the saliva. These observations produce further evidence that malaria parasites were originally confined to an invertebrate host [this *Bulletin*, 1947, v. 44, 158].

[The text states that "one day following the feeding" the mosquitoes were dissected and the salivary glands were injected into other chicks, but the results of these injections are not given. It would have been difficult to interpret the results, because the surface of the glands would have been exposed to infected haemocoelomic fluid. The author does not state whether he had excluded the possibility of transmission having occurred through the crushing of the mosquito, or even by contamination.] *P. C. C. Garnham*

SPANDORF, A. A. & MANWELL, R. D. *In vitro* **Growth of** *Plasmodium circumflexum* **and** *P. vaughani*. *Exper. Parasit.* New York. 1960, Dec., v. 10, No. 3, 287–92. [26 refs.]

Attempts were made to cultivate *Plasmodium circumflexum*, *P. hexamerium* and *P. vaughani in vitro* by the techniques described by ANFINSEN *et al.* [this *Bulletin*, 1947, v. 44, 1043]. The blood used was taken from canaries. Extra supplements of folic acid, B12, coenzyme A, adenine triphosphate, and potassium malate were added in varying amounts.

P. hexamerium multiplied 3·7 times in 72 hours when grown in Harvard medium plus coenzyme A, adenine triphosphate, thioctic acid, and potassium malate 0·005 M, but not with any of these supplements singly. *P. circumflexum* multiplied 2·2 times in 48 hours in the same medium. Better results with *P. circumflexum* were obtained (*e.g.*, average multiplication 3·5 times) when a porcine liver coenzyme concentrate, rich in coenzyme A, plus potassium malate, were used as supplements; in some experiments there was 7·9 times multiplication after 48 hours. At the end of these periods, the parasites were infective for fresh canaries. The importance of coenzyme A and of malate for the metabolism of these malaria parasites is emphasized. On the other hand, all attempt to obtain multiplication of *P. vaughani in vitro* failed although some of the parasites survived and were infective after 72 hours. *F. Hawking*

TRYPANOSOMIASIS

*In this section abstracts are arranged as far as possible in the following order:—*African—*human, animal;* American—*Chagas's disease and other trypanosome infections. In each form the following order is followed:—epidemiology, aetiology, transmission, pathology, diagnosis, clinical findings, treatment, control.*

ORMEROD, W. E. **Cell Inclusions and the Epidemiology of Rhodesian Sleeping Sickness.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1960, July, v. 54, No. 4, 299–300.

In this note the author correlates the type and distribution of cytoplasmic inclusions in *Trypanosoma rhodesiense* with the epidemiological pattern of the disease caused by this parasite in different areas. Thus in strains from Bechuanaland the trypanosomes contained large dense inclusions, whereas those from north of Lake Victoria contained small granules. Moreover in rats southern strains produced remitting infections, while the northern ones produced acute and continuous infections. Strains from Tanganyika occupied an intermediate position, since the trypanosomes had large but scanty inclusions. The geographical difference in the occurrence of inclusions seemed to be related to the past history of Rhodesian sleeping sickness, which in the south (Zambesi basin) had —and still has—a chronic form, but as the disease spread northwards it assumed a more acute form. This extension of the disease was apparently associated with a decrease in the size or number of inclusions in the trypanosomes.

[See also this *Bulletin*, 1959, v. 56, 519.] *C. A. Hoare*

BOWMAN, I. B. R., VON BRAND, T. & TOBIE, Eleanor J. **The Cultivation and Metabolism of Trypanosomes in the Presence of Trehalose with Observations on Trehalase in Blood Serum.** *Exper. Parasit.* New York. 1960, Dec., v. 10, No. 3, 274–83, 7 figs. [17 refs.]

WEINMAN [this *Bulletin*, 1958, v. 55, 377; 1960, v. 57, 792] has stated that recently isolated strains of *Trypanosoma rhodesiense*, which were cultivated *in vitro* as in the tsetse fly, could eventually become again infective for mice; he thought that the presence of trehalose in the medium was an important factor in this development of infectivity. Accordingly the present work was undertaken to investigate the utilization of trehalose by trypanosomes in culture.

Laboratory strains of *T. gambiense*, *T. rhodesiense* and *T. cruzi* were cultivated *in vitro*. It was found that none of these parasites could utilize trehalose as such, but the trehalose was hydrolysed to glucose by an enzyme in the medium and the trypanosomes then utilized the glucose. This enzyme occurred in rabbit serum and also in human, dog and cat blood. The infectivity of these cultures was not restored by prolonged exposure to trehalose. Accordingly, it is concluded that if the addition of trehalose did in fact restore the infectivity of trypanosome cultures in Weinman's experiments, it was probably due to an impurity in the preparation rather than to the trehalose itself. *F. Hawking*

GRAY, A. R. **Precipitating Antibody in Trypanosomiasis of Cattle and other Animals.** [Correspondence.] *Nature*. 1960, June 25, v. 186, 1058–9, 1 fig.

The author describes the precipitation reaction in sera of animals with antigens prepared from *Trypanosoma vivax*, *T. brucei* and *T. gambiense*. Antigens were prepared from the blood of infected rats which was centrifuged and washed, after which the trypanosome suspension was homogenated; the supernatant fluid after re-centrifugation served as antigen. The tests were carried out on agar plates with shallow wells containing antigen and the sera of infected animals, as well as those of controls.

By this method precipitating antibody was demonstrated in cattle infected with *T. vivax*. It also reacted with antigens of other species, but in cross-reactions the lines of precipitation were reduced in numbers and less distinct. Sera of infected rabbits, horse and antelope reacted similarly, as well as those of 3 out of 5 human cases of *T. gambiense* infection. *C. A. Hoare*

WEITZ, B. **The Properties of some Antigens of** *Trypanosoma brucei*. *J. General Microbiol.* 1960, Dec., v. 23, No. 3, 589–600, 3 figs. [20 refs.]

Blood was taken from rats infected with a monomorphic strain of *Trypanosoma brucei*, it was allowed to clot, the clot was removed and the remaining trypanosomes were filtered from the serum. This infected rat serum (IRS) was found to have several properties not possessed by normal rat serum (NRS).

(1) It was more effective in preserving the infectivity of trypanosomes suspended in a medium containing citrate. This infectivity was tested by subsequent injection into mice whose survival times were recorded.

(2) If rabbits were immunized against IRS, precipitin reactions were obtained which were not completely abolished by absorption with NRS. Similarly, rats could be immunized with IRS, and rabbits could be immunized by submitting them to a chronic infection with trypanosomes of this strain. These 3 immune sera contained antibody which reacted specifically with IRS.

(3) Electrophoresis on starch gel (strips being used subsequently as antigen source in a modified Ouchterlony test) showed that the antigenic component of IRS moved with the slower part of the gamma globulin band. The antigenic fraction itself failed to take up the protein stain. This method also showed that the antigenic component of IRS was distinct from the antigenic components of washed trypanosomes which had been subsequently homogenized.

(4) Antisera prepared against IRS agglutinated normal trypanosomes of this strain, but this property was lost after the trypanosomes had been washed.

[These interesting experiments have been carefully described but the conclusions go somewhat beyond what is recorded in this paper and its preceding short note (*Nature*, 1960, v. 185, 788) in the following ways:—

(1) Use of the term " exoantigen ", which the author employs for the antigenic component of IRS, implies either that the factor is present on the surface of the organism or that it is normally liberated by the intact organism in the medium in which it circulates. True, the factor acts as an agglutinogen, but this does not mean that it is specifically superficial, and the fact that it is found in serum in which moribund trypanosomes have been squeezed by a contracting blood clot suggests that the factor might have been liberated *in vitro*. (The abstracter

believes that the coining and use of the term " exoantigen " is premature and is liable to confuse the reader in his assessment of the work.)

(2) The author assumes that the antigenic factor is also responsible for the protection effect. This protection, which is not of a high order, could also be explained by differences in the total protein of IRS and NRS, or by differences in the factor which makes NRS superior in this respect to, say, horse serum.

An error in the list of references states that THILLET and CHANDLER (this *Bulletin*, 1957, v. 54, 1164) worked with *T. brucei*. The author gives the species correctly in the text as *T. lewisi*. Confusion may, however, arise owing to his emphasis of the similarity of claims made by these authors with his own which do concern *T. brucei*.

Despite these criticisms, the reader is recommended to consult this interesting paper in the original.] *W. E. Ormerod*

BENNETT, G. F. **On the Specificity and Transmission of some Avian Trypanosomes.** *Canadian J. Zool.* 1961, Feb., v. 39, No. 1, 17–33, 3 figs. [31 refs.]

PESSÔA, S. B. Hospedeiros vertebrados (não humanos) do *Trypanosoma cruzi*. [**Non-Human Vertebrate Hosts of** *Trypanosoma cruzi*] *Rev. Goiana Med.* 1958, Apr.–June, v. 4, No. 2, 83–101. [75 refs.] English summary.

The author gives a comprehensive critical review of the question of the role played by reservoir hosts as sources of human infection in Chagas's disease. It is pointed out that, although trypanosomes morphologically indistinguishable from *Trypanosoma cruzi* have been recorded from diverse animals in the Americas, they cannot all be regarded as belonging to this species, since some of them differ from it in the course of development in the vertebrate host, in host-specificity, in transmissibility by triatomine bugs and in other biological characteristics. The differential characters are particularly clear in the case of the bat trypanosomes, *T. vespertilionis* and *T. pipistrelli*. Among trypanosomes attributed to *T. cruzi* are also included those said to occur in " naturally infected " Asiatic macaque monkeys. [However, it is significant that all such cases were found in imported monkeys kept in Europe and North America under conditions that did not exclude accidental infection with laboratory strains of *T. cruzi*.]

Nevertheless, the role of some wild mammals as reservoirs of human Chagas's disease has been established beyond doubt, especially in the case of armadillos and opossums. As a rule the infection in these animals runs a mild or symptomless course, but the virulence of the " wild " strain may be enhanced when inoculated into domestic animals, such as dogs. According to the author, infection with *T. cruzi* is enzootic among wild mammals and is transmitted to them by " wild " vectors, but the parasite may adapt itself to vectors domiciliated in human dwellings, with the result that Chagas's disease becomes enzootic among the domestic mammals, *e.g.*, dogs, cats, guineapigs, and endemic among the human inhabitants. The author then provides examples of the epidemiological situation in various countries of South America, in some of which the prevalence of Chagas's disease depends entirely on the introduction of *T. cruzi* from wild reservoirs, whereas in others it is purely endemic and independent of these.

C. A. Hoare

KÖBERLE, F. Hiperplasia muscular no megaesôfago chagásico. [**Muscular Hyperplasia in Chagasic Megaoesophagus**] *Rev. Goiana Med.* 1960, Apr.–June, v. 6, No. 2, 147–53, 2 figs. English summary (8 lines).

The author first points out that in the normal oesophagus the muscular layer is about 1 mm. thick but that in megaoesophagus due to Chagas's disease it can be as much as 10 mm. He regards this as due to hyperplasia and not to hypertrophy, and as it is generally recognized that in stenotic lesions of the digestive tube causing an increase in the muscular layers the effect is more marked on the inner layer, he studied the thickness of both layers in 5 normal subjects and in 10 patients with megaoesophagus due to Chagas's disease by a special procedure [details in the text].

It was found that while in the 5 normal subjects the ratio of outer to inner layer was 1 : 0·8, in the 10 mega patients, although the outer layer was thicker on the average than in normal persons, the average ratio to the inner layer was 1 : 3·7. This cannot be explained merely by hypertrophy due to work and is not found in the longitudinal fibres but only in the circular. The author considers the fundamental factor found in cardiac and skeletal as well as in smooth muscle to be distension of the muscle fibres [see also this *Bulletin*, 1960, v. 57, 571].

W. K. Dunscombe

REIS, L. C. F., DE OLIVEIRA, H. L. & VIEIRA, C. Curvas glicêmicas anormais observadas em pacientes com a forma crônica da moléstia de Chagas. Nota preliminar. [**Abnormal Glucose Tolerance Test observed in Patients with Chronic Chagas's Disease**] *Rev. Goiana Med.* 1960, Apr.–June, v. 6, No. 2, 155–65, 5 figs. English summary.

The blood-sugar curve was studied in 19 patients each of whom showed a positive Machado-Guerreiro (M-G) test. They were divided into 2 groups: (1) 8 with evidence of some organic lesion; (2) 11 without such evidence. A third group of 4 normal persons with negative M-G tests acted as controls.

The blood sugar was estimated by the Folin and Wu method. The tests were made while the subjects were fasting, and after ½, 1, 2, 3, and 4 hours. In addition to an oral dose of 100 gm. glucose, tests were made after intravenous injection of 20% solution of glucose infused for 20 min. (0·5 gm./kgm.), and in some cases also after intramuscular injection of 0·01 ml./kgm. 1 : 1000 adrenaline.

When groups 1 and 3 were compared it was found that in the patients with chronic Chagas's disease (group 1) there was a rapid rise in the curve to about 200 mgm.% within 30 minutes, but no hypoglycaemic phase was found. Group 2 showed a more or less normal curve.

There is an excellent English summary. *W. K. Dunscombe*

PHILLIPS, N. R. **Experimental Studies on the Quantitative Transmission of** *Trypanosoma cruzi*: **Aspects of the Rearing, Maintenance and Testing of Vector Material, and of the Origin and Course of Infection in the Vector.** *Ann. Trop. Med. & Parasit.* 1960, Dec., v. 54, No. 4, 397–414, 2 figs. [20 refs.]

The following species of bug were reared on rabbit for various experiments on their infection with and transmission of the BH strain of *Trypanosoma cruzi*:

Rhodnius prolixus, *Triatoma infestans*, *T. protracta* and *Eutriatoma maculata*. They were kept at 30°C. and 70–75% RH, except when being fed on the rabbit's ear. For this, the gauze-covered tubes of small larvae were applied to the ear, and for older larvae and adults the ear was inserted into the jars containing them. For collecting bug faeces for infection tests, a bug was confined in a gauze-sealed cylinder applied to the underside of a box-like frame within which rested a mouse anaesthetized with Nembutal. The faeces dropped onto a coverslip at the bottom of the cylinder. The apparatus is figured, and this shows also a modification by which hungry bugs could be made to feed from gorging bugs.

The infection experiments re-examine coprophagy (bugs imbibing bug faeces) and cannibalism (one bug feeding from another) as sources of *T. cruzi* infection in bugs, but neither is considered likely to be of practical epidemiological significance in nature. Of 400 larvae given opportunity to imbibe infected faeces only 5 *R. prolixus* larvae did so, and these failed to develop infections. None of the other species fed from faeces. In a substantial series of trials cannibalism of young larvae of *R. prolixus* on older infected larvae, and also between *T. infestans* larvae and between larvae of these two species, occurred on altogether 27 occasions, with failure to establish infection in a few cases. Long starvation was necessary to induce cannibalism and the apparatus offered optimal encouragement; it is concluded that cannibalism is probably an infrequent event in nature. (The term "haematoklepty" is proposed instead of "klepto-haemodeipnonism" or cannibalism, the latter to be restricted to predation in which, as happens, only haemolymph is taken up.) High infection rates in vectors in the field are not dependent on either of these mechanisms, but are explicable by the fact that, in its life cycle, a bug has several chances of becoming infected, even although infection in animal hosts is sparse and low; moreover, a low intake by bugs is intensified by the parasites' subsequent multiplication, as well known in the xenodiagnostic test.

The time required for bug faeces to become infective was determined only for the combination of *T. cruzi* and *R. prolixus*, and for all five larval stages and adults of this species. With a few anomalous results, faeces were infective in all stages of the bug on the 7th day at 20°C., on the 3rd day at 25°C., and on the 2nd day at 30° and 35°C. This is illustrated by a figure which also shows for each temperature level the time required by each larval stage to moult. Ecdysis occurred always a considerable number of days after the faeces were first infectious. Since infectivity thus precedes ecdysis, transmission is possible within a single larval stage if feeding should occur on more than one occasion during the stage. Bugs at 35°C. were abnormal as regards ecdysis, either failing to moult or dying in the process. It is thought that these findings may apply to other pathogen-vector combinations. *D. S. Bertram*

LEISHMANIASIS

In this section abstracts are arranged as far as possible in the following order:—visceral, cutaneous, muco-cutaneous.

FRAGA DE AZEVEDO, J. Sobre o diagnóstico do Kala-azar. [**The Diagnosis of Kala Azar**] Reprinted from *J. Méd.* Porto. 1960, Oct., v. 43, No. 925, 265–72, 3 figs. [30 refs.]

The Director of the very well-known Institute of Tropical Medicine at Lisbon puts forward some views on the epidemiology of kala azar as it occurs in Portugal and suggests two methods for its rapid diagnosis. The disease has been compulsorily notifiable from 1950 and since that time 38 cases have been studied by the author, while 11 cases of cutaneous leishmaniasis have been seen since 1936.

He points out that the incidence of the disease is not always consistent with the possible role of *Phlebotomus* as the vector, and that some familial association can occur [see, for example, SYMMERS, this *Bulletin*, 1960, v. 57, 1033]. While the campaign of malaria eradication has resulted in a spectacular fall in the number of cases of that disease, this has not been so for the admittedly very much smaller number of cases of kala azar. Stray dogs are an important reservoir.

For diagnosis he has found that films from scrapings of the nasal mucosa gave 16% positive results, while blood culture, on NNN medium by a technique described, gave 34·2% positive results, both together giving at least 42%. He mentions that these procedures are less painful than sternal puncture and less dangerous than spleen puncture. The epidemiological importance of finding *Leishmania* in nasal scrapings and in the blood is obvious.

[The procedure for blood culture differs only in technical detail from that mentioned in *Manson's Tropical Diseases*, 15th Ed., p. 149 (*ibid.*, 1961, v. 58, 544).] *W. K. Dunscombe*

SILVER, R. T., PEDREIRA, L., KORNGOLD, L. & ENGLE, R. L., Jr. **Studies of Serum Protein Abnormalities in Kala Azar.** *Proc. Soc. Exper. Biol. & Med.* 1961, Feb., v. 106, No. 2, 365–8, 3 figs. [16 refs.]

Changes specific for kala azar have been reported in the serum proteins as seen on paper electrophoresis. Serum from 5 patients with the disease in Brazil was examined in the United States by this method and by starch-gel electrophoresis and the gel-diffusion technique. All showed an additional concentration of protein in the " slow gamma " region. 3 showed additional protein (1 or 2 bands) in the " fast gamma " region. On paper, there was the recognized increase in gamma globulin, and in 3 cases (thus not invariably) there was additional protein at the line of origin, and this appears to be identical with the " fast gamma " bands seen on starch. The " slow gamma " increase, however, does appear to be specific, for gel diffusion experiments with suitable antigens show it to differ from the corresponding proteins that are seen in myeloma and cirrhosis of the liver. At the same time the presence of macroglobulins was

confirmed, agreeing with the positive "water-dilution" tests in kala azar and the demonstration of cryoglobulins [this *Bulletin*, 1945, v. 42, 262].

[See also *ibid.*, 1946, v. 43, 1027; 1954, v. 51, 160.] *Alan B. Raper*

TAJ-ELDIN, S. & AL HASSANI, M. **Kala-Azar in Iraq. Analysis of 100 Cases.** *J. Facul. of Med., Baghdad.* 1961, Jan., v. 3 (n.s.), No. 1, 1–9, 8 text figs. & 3 figs. on pl. [11 refs.]

The authors write from the Department of Paediatrics, College of Medicine, Baghdad. 130 cases of kala azar were admitted to the Children's Welfare Hospital between 1954 and 1960, the numbers varying annually from 3 in 1955 to 37 in 1960, and showing in general an annual increase. 100 of these patients are analysed in detail. The children were aged 6 months to 8 years, more than half being under 3 years old. No familial infections were recorded, which is unlike the experience of KIRK in the Sudan [this *Bulletin*, 1949, v. 46, 815].

Most of the patients came from rural areas in foci falling on 5 lines radiating from Baghdad and following the main roads [shown on a map]. The clinical features of protracted fevers, splenomegaly and hepatomegaly were in general agreement with the findings of others. Generalized adenopathy was found in 43%, and the leucocyte count averaged 4,700 per cmm., with 76% lymphocytosis and 17% monocytosis in the 56 patients examined. The red cells were less than 2·5 million per cmm. in 56% and haemoglobin (Sahli) below 50% in 95% of the patients. *Leishmania donovani* were found in 80 of 95 bone-marrow smears, 22 of 27 splenic punctures and in all of 3 lymph gland punctures made. In 1 of 3 nasal smears the organism was isolated. Liver function tests were positive in 94% and the formol gel in 41%. Neostibosan was given to 3 patients, but failed in 2. These 2, together with the other 97, were given pentavalent antimony gluconate [Solustibosan 1 cc.=0·1 gm. pentavalent antimony]. The patients received 0·1–0·15 cc. per kgm. daily in one or two divided doses for 10–12 days.

14 patients died, 3 before treatment, 2 on the second day, 4 on the third day, and 1 each on the fourth to the sixth days of treatment and 2 after treatment had been completed. 9 other patients did not complete the course; of the 78 who did 54 became apyrexial in about 6 days. 5 patients had relapses after apyrexial periods of 6 to 14 days. In some patients the temperature was lowered but did not fall to normal.

The differential diagnosis is discussed and it is concluded that endemic kala azar in Iraq resembles the Mediterranean type. *H. J. O'D. Burke-Gaffney*

SANDERSON, K. V. **Cutaneous Leishmaniasis in South Australia.** *Med. J. Australia.* 1961, Feb. 11, v. 1, No. 6, 193–5, 5 figs. (3 on pl.)

An account of 5 cases in Italian immigrants.

FEVERS OF THE TYPHUS GROUP

In this section abstracts are arranged as far as possible in the following order:—general; louse-borne typhus, flea-borne typhus, mite-borne typhus; rickettsialpox; tick-borne typhus; Q fever, other rickettsial diseases.

BAYLET, R., KIRSCHE, P. & MAROUBY. Place des rickettsies dans la pathologie cardio-vasculaire en Afrique de l'Ouest. [**Role of Rickettsiae in Cardio-vascular Lesions in West Africa**] *Méd. Afrique Noire*. Dakar. 1961, Mar. 1–15, v. 8, No. 5, 89.

An account of 5 cases. [See also this *Bulletin*, 1961, v. 58, 434.]

BONDARENKO, V. I. **Experimental Study of Sporadic Cases of Typhus.** *Problems of Virology*. London. 1960, v. 5, No. 3, 378–84. [13 refs.] [Translated from Russian.]

Intraperitoneal inoculation of guineapigs with blood (suspensions of blood clot) from 146 patients with typhus fever yielded 62 strains of rickettsiae [apparently *Rickettsia prowazeki*, although this is not stated specifically]. Of these strains, 39 were from patients with primary attacks and 23 from patients with second attacks of the disease. The proportion of successful attempts to isolate rickettsiae was greatest when guineapigs were inoculated with blood collected from patients whose temperature was 39·1°C. [102·3°F.] or higher (11 out of 11 from primary and 5 out of 6 from second attacks). No differences were observed between rickettsiae from primary and second attacks in respect of the course of the experimental disease and antibody response in guineapigs.

R. S. F. Hennessey

WOJCIECHOWSKI, E. Wpływ hialuronidazy na przebieg zakażenia riketsjami duru wysypkowego u zwierząt laboratoryjnych. [**The Course of Epidemic Typhus Infection in Laboratory Animals treated with Hyaluronidase**] *Med. Dośw. i Mikrob*. Warsaw. 1960, v. 12, No. 4, 389–96, 1 fig. [14 refs.] English summary.

An investigation has been made of the effect of treatment with hyaluronidase on the toxicity of *Rickettsia prowazeki* for mice. The toxin preparation consisted of a suspension of infected yolk sacs in milk; it was injected intravenously or intraperitoneally in varying doses in groups of mice and the LD50 was determined. The LD50 by the intravenous route was not affected by the simultaneous administration of 10 turbidimetric units of hyaluronidase by either route. The intraperitoneal toxicity, however, was increased 1·8–3·6-fold by the intraperitoneal administration of hyaluronidase. The intraperitoneal injection of hyaluronidase did not produce any intensification of infection in mice infected by the same route with subtoxic doses of *R. prowazeki*. *D. J. Bauer*

SUITOR, E. C., Jr. & WEISS, E. **Isolation of a Rickettsialike Microorganism (*Wolbachia persica*, n.sp.) from *Argas persicus* (Oken).** *J. Infect. Dis.* 1961, Jan.–Feb., v. 108, No. 1, 95–106, 10 figs. [31 refs.]

PICKENS, E. G. & GAON, J. A. **Growth of *Coxiella burnetii* in Agar Tissue Culture.** *Amer. J. Trop. Med. & Hyg.* 1961, Jan., v. 10, No. 1, 49–52, 1 fig.

This paper describes experiments which showed that *Rickettsia burneti* proliferated in a chick-embryo tissue culture system. Infectious titres for mice were considerably lower than those obtained with cultures in yolk sacs. From comparisons of antigenic activity, the final yield of rickettsiae in tissue cultures and yolk sac cultures seemed to be of the same order, the percentage of viable organisms being lower in the tissue cultures. *R. S. F. Hennessey*

WINN, J. F., ABINANTI, F. R., LENNETTE, E. H. & WELSH, H. H. **Q Fever Studies. XXII. Inoculation of Sheep by the Intestinal Route.** *Amer. J. Hyg.* 1961, Jan., v. 73, No. 1, 105–13, 2 figs. [11 refs.]

Introduction of capsules containing *Rickettsia burneti* directly into the small intestine was followed by the appearance of antibodies in the sera of 2 out of 6 sheep; 5 sheep were pregnant at the time of inoculation, and *R. burneti* was subsequently recovered from the placentas of 4 of them. *R. burneti* was recovered from the faeces of the single non-pregnant sheep, but only on the first and fourth days after inoculation. Altogether, rickettsiae were encountered in the secretions or excretions of 5 animals and in the tissues of 2 at autopsy.

It is concluded that infection of sheep by the intestinal route would appear to be possible, although the relative importance of this route could not be assessed from the limited work described in this paper.

[See also this *Bulletin*, 1960, v. 57, 26.] *R. S. F. Hennessey*

DENGUE AND ALLIED FEVERS

RODGER, L. M. **An Outbreak of Suspected Chikungunya Fever in Northern Rhodesia.** *South African Med. J.* 1961, Feb. 18, v. 35, No. 7, 126–8.

In Luanshya in May and June 1959, 13 cases of a febrile illness occurred. All the patients had lymphadenitis at onset and 4 of 12 had arthritis at onset; 2 others had arthritis in convalescence. 5 had sore throat and 2 of them also a sore tongue. 8 had a skin rash and 7 conjunctivitis. 2 had severe muscle pains, 3 pneumonia and 1 splenic enlargement. 3 had prolonged convalescence.

The first 2 patients (aged 15 and 16 years) had been fishing on the Kafue River and had complained of being bitten severely by mosquitoes. The next 3 patients had also been on the Kafue River. The last 5 patients, falling ill in June, had not left Luanshya but 1 of them lived very close to one of the earlier patients. There had been an unusually high population of *Culex fatigans* in the town.

Convalescent sera from 2 patients and late sera from 7 others were tested for haemagglutinin-inhibiting antibody to Chikungunya and Semliki Forest viruses:

titres of 320 or higher were demonstrated in sera of 5 patients and titres against Semliki virus were 40 in sera of 2 patients. In one serum tested, complement was fixed with Chikungunya but not Semliki antigen. *C. E. Gordon Smith*

RABIES

LIBEAU, J. Enquête sur les cas de rage canine en Afrique. [**Enquiry into the Cases of Canine Rabies in Africa**] *Bull. Epizootic Dis. of Africa.* 1960, Dec., v. 8, No. 4, 289–94.

This report gives the results of an analysis by the Inter-African Bureau for Animal Health (IBAH) of 1,309 questionnaires received between late 1956 and March 1960 and dealing with the laboratory-confirmed cases of canine rabies uncovered during that period in 28 countries in Africa south of the Sahara. In addition to giving the geographical distribution of the cases, the report provides information on the (i) age, (ii) sex, (iii) vaccination state and (iv) clinical symptoms of the 1,309 dogs diagnosed as rabid and on the (v) laboratory methods employed in establishing such diagnosis.

As regards (i): among 573 animals of known age, 240 (42%) were under 12 months old, 201 (35%) from 1 to 3 years and 132 (23%) over 3 years—figures showing the highest incidence of rabies to have been among animals under 1 year of age. As regards (ii): among 644 animals, with their sex indicated on the questionnaires, 461 (71%) were males and 183 (29%) females—a difference in incidence attributable, not to a greater susceptibility of males to the disease, but, *inter alia*, to their more aggressive nature, which renders them more liable to infection through wounds received during their fights with other animals. As regards (iii): of the 76 dogs with a history of previous vaccination only 32 had met the conditions required for successful canine prophylaxis; of the remaining 44, some had been vaccinated less than 1 month, others more than 1 year, before death. As regards (iv): of 1,036 animals, with clinical histories recorded on the questionnaires, 74% had developed the furious form of the disease and 26% the paralytic form.

As regards (v): the laboratory methods employed in diagnosis were histological examination of brain specimens for Negri bodies and biological tests for demonstration of the virus in brain—and in salivary gland—material. These 3 types of examination were carried out either singly or in combination: 1 type only in 497 (38%) of the investigations, 2 types in 624 (48%) and all 3 types in 188 (14%). The overall results may be summarized as follows: microscopic examination proved 80% of the brain specimens to be Negri-positive, 16% to be Negri-negative and 4% to be doubtful; biological tests were positive in 96·5% of the brain specimens and in 81% of the salivary gland specimens. Comparison between these results and those obtained from 188 rabid animals to which all 3 diagnostic methods had been applied showed that, with respect to the latter group, Negri bodies were present in 148 (78·7%) of the brains examined and that virus was isolated from 184 (97·87%) of the brains and from 151 (80%) of the salivary glands. *G. Stuart*

BEÇAK, W. & BAIXERAS, A. Produção de anticorpos anti-rábicos em camundongos submetidos a radiações beta-gama. [**Production of Rabies Antibodies in Mice Exposed to Beta-Gamma Radiation**] *Mem. Inst. Butantan.* 1959, v. 29, 227–32. [15 refs.]

The English summary appended to the paper is as follows:—

"Mice previously exposed to beta-gamma radiations (500 r and 1,000 r) were inoculated with antigen consisting of inactivated rabies virus (Semple vaccine), in order to detect changes in the behaviour after intracerebral inoculation of rabies virus (CVS).

"The mortality of inoculated animals is directly related with the intensity of irradiation; neutralizing tests proved that this increasing mortality corresponds to a decrease in the formation of antibodies in the irradiated and vaccinated animals."

PLAGUE

In this section abstracts are arranged as far as possible in the following order:—epidemiology, aetiology, rodent hosts, transmission, pathology, diagnosis, clinical findings, treatment, control.

TORRES BRACAMONTE, F. & GONZÁLEZ MOSCOSO, R. Estado actual de la peste en Bolivia. [**Present Situation regarding Plague in Bolivia**] *Rev. Salud. Pública Boliviana.* 1960–61, Dec. 15–Jan. 15, v. 2, No. 2, 11–16, 1 map.

The authors belong to the medical department of the *Yacimientos Petrolíferos Fiscales Bolivianos* (YPFB), a large petroleum concern, of which the senior author is Medical Director.

Sylvatic plague, with its usual threat to domestic rodents and to man, has long been a serious public health problem in Bolivia. There have not, however, been severe outbreaks on the scale of those occurring in 1928, 1932 and 1958 since the creation of the National Plague Service (SNP), which has been able to achieve partial control. The authors point out that to obtain more complete control, that service would require much greater provision and facilities than it now possesses.

The endemic area is shown on a map. It occupies a narrow strip in the south-central region extending from the frontier with Argentina to Santa Cruz in a zone intermediate between the mountainous region in the west and the plains in the east and south-west. Between the mountain ridges are plains traversed by several rivers. The climate is agreeable and the vegetation is lush, so that conditions are very suitable for rodent life.

Since 1950, the area has tended to spread slowly both northwards and westwards, invading areas previously considered free from plague; for example, new foci have been discovered in San Carlos, Presto and Mojocoya.

In the last 12 years 15 outbreaks of human plague have been recorded in 40 localities in the departments of Chuquisaca, Tarija and Santa Cruz. These are listed and set out chronologically in 2 tables. The number of individual cases

varied from 1 to 14, but were usually less than 7. There were 179 cases in all during the period 1949–1960, with 91 deaths (50·84%).

The authors are particularly concerned with the appearance of plague in the 3 new foci mentioned above. San Carlos has a very large number of agricultural workers and important railways connexions: similarly, if plague is not controlled in Presto and Mojocoya, cities like Sucre and Cochabamba and the country between might well be threatened. The authors suggest various methods for technical improvement of present measures, such as better epidemiological survey and notification, extension of the area under control, and closer cooperation in the frontier zones with the neighbouring republics of Argentina and Paraguay. The authors believe that the high mortality, despite modern therapy, is partly to be attributed to delay in recognition of cases of plague. They advocate as a matter of urgency the transfer of the headquarters of the SNP from Sucre, which is remote from the endemic area, to Camiri which is in the centre of it. Camiri has all the facilities of a modern city and is an important centre of air, rail and road communications. There might well be a sub-unit further south in Villa Montes, which city is an area of economic importance, owing to the installation of new petroleum equipment and also to its agricultural and forest activities.

Finally, the authors suggest that the activities of the SNP would be greatly strengthened by cooperation with the medical department of the YPFB, which has so many appropriate facilities. *H. J. O'D. Burke-Gaffney*

RALL', I. M. & FEDOROV, V. N. **The Physiological Evaluation of Rodents as Plague Carriers and the Monohostal Character of Natural Foci of Plague.** *J. Microbiol., Epidemiol. & Immunobiol.* London. 1960, v. 31, No. 2, 228–35. [16 refs.] [Translated from Russian.]

This is an interesting essay on sylvatic plague as seen in the U.S.S.R. While the authors agree that hibernating rodents show increased resistance to infection during the period of hibernation, they point out that all rodent carriers of plague do not hibernate; susliks are hibernating rodents but gerbils are not. Their main thesis, however, is that in most cases there is only one species that is an important carrier in any particular area.

Many different species may be shown to be plague carriers; these can be divided into permanent and temporary or incidental carriers. The complete destruction of the permanent carrier in any particular zone or area will lead to the cessation of the enzootic, whereas the destruction of all the other species will be ineffective. Good evidence is produced to show that natural foci of sylvatic plague display this mono-hostal character. For instance in the outbreak in Northern Daghestan of 1951–52, the mixed population of dwarf susliks, tamarisk gerbils, voles, domestic mice and jerboas in the first year reached a concentration of 160 per hectare, among which the number of susliks (55) and voles (89) predominated. In the second year after the area had been gassed the total density of rodents had decreased to 50 per hectare with a marked reduction in the number of susliks but with an increase in the proportion of mice, voles and gerbils. These findings could have served as an example of a poly-hostal focus, but within 2 years an investigation of 3,496 susliks, 1,104 gerbils and 750 other rodents showed that 140 susliks yielded positive cultures of *Pasteurella*

pestis but of the other rodents only a single gerbil was positive and over the following 6 years *P. pestis* isolations were restricted to occasional cases among susliks.

[It is of interest to note that the authors quote the field studies in India by BALTAZARD and BAHMANYAR in 1958 [this *Bulletin*, 1961, v. 58, 58] which showed that the Indian gerbil (*Tatera indica*) serves as the only natural carrier of plague there and transmits the causative organism to the rat population. In a recent address on plague on the occasion of the Diamond Jubilee of the Haffkine Institute, Bombay, in 1959 [*ibid.*, 1960, v. 57, 1261] SEAL referred to the work of BALTAZARD in Uttar Pradesh but he was not convinced of its significance.] *H. J. Bensted*

KOZAKEVICH, V. P., MINKOV, G. B. & SIDOROVA, N. K. **The Use of Cortisone for the Detection of Infection with Plague in Little Susliks.** *J. Microbiol., Epidemiol. & Immunobiol.* London. 1960, v. 31, No. 2, 236–40. [22 refs.] [Translated from Russian.]

Cortisone administered either in the spring or in the summer to sexually mature little susliks was found to have a marked effect on the metabolic rate and associated phenomena of these rodents. In experimentally infected animals, the avirulent EB strain injected during the spring period was much more frequently isolated from the spleen and other organs of those treated with cortisone than in the case of controls. Similarly, susliks treated with cortisone were found to be much more sensitive to infection with virulent strains of plague bacilli than control animals and the survival time was significantly less. *H. J. Bensted*

SHTEL'MAN, A. I. **The Use of Cortisone for the Detection of Latent Plague Infection. I. Diagnosis of Latent Infection with Plague in Midday Gerbils (*Meridiones meridianus* Pall.) with the aid of White Mice treated with Cortisone.** *J. Microbiol., Epidemiol. & Immunobiol.* London. 1960, v. 31, No. 2, 240–47. [Translated from Russian.]

In a number of experimentally infected midday gerbils in which a highly virulent strain of *Pasteurella pestis* was used there was a significant proportion of surviving animals which failed to show, when they were killed at the end of 12 days, any gross tissue changes at post-mortem examination and *P. pestis* could not be isolated from their livers and spleens by direct cultural tests. Tissue passage was carried out with two groups of mice: one group received cortisone before the test material was inoculated while the other group were not so treated. The mice treated with cortisone yielded a far higher proportion of positive cultures than the untreated animals. *H. J. Bensted*

BLIAKHER, S. L. **The Effect of Cortisone on Acquired Immunity.** *J. Microbiol., Epidemiol. & Immunobiol.* London. 1960, v. 31, No. 3, 514–19, 1 fig. [19 refs.] [Translated from Russian.]

Mice are sensitive to cortisone, and white mice treated with cortisone are less resistant to infection, when challenged with cultures of *Pasteurella pestis*, than

similar groups of mice that have not been so treated. The author reports that the increased sensitivity induced by cortisone is less marked in the case of groups of mice actively immunized against *P. pestis* than in unvaccinated mice. The different survival rates in active protection tests with vaccines made from different strains of *P. pestis* have suggested to the author that the use of mice treated with cortisone might be valuable for the assessment of the potency of different plague vaccines.

[While this may be theoretically possible it seems unlikely as a practical proposition, unless almost prohibitively large numbers of mice are used with full controls at every stage of the tests (see BUCKLAND and TREADWELL, *J. Hygiene*, 1961, v. 59, 49).] *H. J. Bensted*

DERTEVA, I. I. **The Action of Plague Antiserum on *Pasteurella pestis in vitro* and in Animals. V. The Influence of Plague Antiserum on Changes in the Reactivity of the Body to Plague Antigen.** *J. Microbiol., Epidemiol. & Immunobiol.* London. 1960, v. 31, No. 3, 499–502. [Translated from Russian.]

The supernatant of a centrifuged suspension of killed virulent *Pasteurella pestis* contains an allergic substance—pestin—which, injected intradermally into sensitized animals, gives rise to a reaction which is characterized by infiltration at the site of the injection with an area of central necrosis. Guineapigs actively immunized with plague vaccine give a strong positive skin reaction after the intradermal pestin injection. Animals passively immunized, whether with raw plague antiserum or its gamma globulin fraction, also give a positive reaction; its intensity is very much less than that observed in actively immunized guineapigs, but is more marked than in animals receiving only normal horse serum. The intensity of the skin reaction reflects to some extent the degree of resistance to be expected to a subsequent challenge with a virulent culture of *P. pestis.* *H. J. Bensted*

CHOLERA

In this section abstracts are arranged as far as possible in the following order:—epidemiology, aetiology, pathology, diagnosis, clinical findings, treatment, control.

ABOU-GAREEB, A. H. **A Cholera Enquiry among Boatmen at Calcutta in 1959.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1961, Jan., v. 55, No. 1, 81–8.

A cholera enquiry was carried out on a sample of 1,000 boatmen, investigated at different locations along the River Hooghly and its associated canals.

98·4% of these disposed of their night soil directly into the river or canal and about the same proportion used the same water for ablution. A history of cholera attacks was given by 4·8% of those investigated. River water was used for drinking by 79·2% of those attacked, as against 64·9% of the unattacked group. A history of severe diarrhoeal disease was given by 19·7%, of whom 70·0% drank river water as against 62·0% of those not attacked. None of those

who contracted cholera had received anti-cholera inoculation, while 36·1% of those not attacked had been inoculated.

Choleraic disease is highly prevalent among the boatmen of Calcutta, since 24·5% of those investigated had experienced 269 attacks of cholera or severe diarrhoea. The drinking of raw river water is thought to be a contributory factor. *G. Covell*

MITRA, S. & CHATTERJEE, G. C. **Lecithin-Splitting Enzyme of *Vibrio* El Tor.** [Correspondence.] *Nature*. 1961, Mar. 11, v. 189, 837.

BANKS, A. L. **Religious Fairs and Festivals in India.** *Lancet*. 1961, Jan. 21, 162–3.

The author (who recently worked for one year in Uttar Pradesh) explains the circumstances of the great religious fairs of India, especially those which attract the greatest number of pilgrims and are held at intervals of 6 years. One of the objects is to bathe at the confluence of the Ganges and Jumna rivers, and these fairs have usually led to great outbreaks of cholera and other diseases, as in 1948. In 1954 compulsory immunization against cholera was introduced [this *Bulletin*, 1955, v. 52, 447].

The author was present at the 1960 fair at Allahabad, and describes the sanitary organization of an area of 35 square miles prepared to receive the millions of pilgrims. They were assigned to camps and had to pass more than 1 cholera inoculation centre to get there. Environmental sanitation was by trench latrine and the attendants enforced scrupulous cleanliness. No flies or rubbish or waste material could be seen. A tent hospital was adequate for the occasion, water supplies were good, crush barriers were constructed to prevent crowding which in 1954 had caused many crush deaths, and there was a health exhibition which proved very popular. Infective diseases were absent in 1960. The author was evidently very greatly impressed by this enormous achievement in the prevention of disease, and gives full credit to the medical staff of Uttar Pradesh for their foresight and tact in dealing with the pilgrims.

Charles Wilcocks

AMOEBIASIS AND INTESTINAL PROTOZOAL INFECTIONS

In this section abstracts are arranged as far as possible in the following order:—epidemiology, aetiology, pathology, diagnosis, clinical findings, treatment, control.

LAMY, L. Commentaires sur les kystes et l'enkystement des amibes dysentériques. [**Discussion on Cysts and Encystment of Dysentery Amoebae**] *Bull. Soc. Path. Exot.* 1960, Mar.–Apr., v. 53, No. 2, 250–56.

In this review the author considers critically the prevalent conceptions and misconceptions regarding the nature and significance of encystment in *Entamoeba histolytica*. After discussing (1) the question whether they represent resistant stages produced under unfavourable environmental conditions; (2) the

presence of cysts in tissues; (3) their relation to sexual phenomena and (4) to pathological conditions in the host, he concludes as follows. In *E. histolytica* the cyst represents a resting stage that serves for the protection and multiplication of the parasite, and especially for the propagation of its species. This process depends on diverse conditions, including the environment and the associated bacterial flora, but it is not the result of the appearance of unfavourable conditions. Cysts are not produced within the tissues and encystment cannot be regarded as a process of "regeneration" comparable to the sexual phenomena involving exchange of nuclear material. Cysts are incapable of starting a new cycle of development *in situ*, but must first pass to the exterior, outside the host's body. The presence of cysts does not indicate an aggravation of the host's condition. Moreover, while at a given period the host may be regarded as a healthy, or rather symptomless, carrier, it cannot be asserted that this condition will persist, unless it is assumed that in such cases *E. histolytica* is not pathogenic. *C. A. Hoare*

BAKÁCS, T. & JANKÓ, Maria. **Histopathological Findings in Cats infected with** *Entamoeba histolytica*. *Acta Microbiologica*. Budapest. 1960, v. 7, No. 2, 107–12, 5 figs. [13 refs.]

The object of the study described in this paper was to determine the pathogenicity for kittens of strains of *Entamoeba histolytica* isolated in culture from stools of Hungarian children suffering from various forms of clinical amoebiasis, *viz.*, latent infection with periodical symptoms, amoebic colitis and dysentery. Each animal was inoculated intracaecally after laparotomy with 3 ml. of culture sediment. All the animals died with signs of amoebic dysentery after about 6 months, though during the first 3½–5 months the infection ran a symptomless course. Post-mortem examination revealed characteristic changes, such as necrotic areas, oedematous swelling and round-cell infiltration in the colon, with numerous amoebae in the intestinal glands. The spleen was enlarged and showed signs of a septic condition. It is claimed that amoebae were found in this organ.

When cysts of *E. histolytica* were present in the children, their measurements in different cases varied from 13μ to 23μ in diameter. The authors comment that "there was no correlation between the size of cysts and the clinical course of the disease either in patients or in animals". [Judging from the size of the cysts, they all belong to the "large race" of *E. histolytica*.] *C. A. Hoare*

MAGAUDDA-BORZI, L., PENNISI, L. & BERTUCCI, B. La sierologia dell'amebiasi. Nota VI. Studio sulla influenza degli antigeni batterici in prove di r.d.c. su sieri "normali" saggiati con criolisati ottenuti da varie *Entamoeba* (*E. histolytica*, *E. invadens*, *E. moshkovskii*) e dalle relative flore batteriche associate. [**Serology of Amoebiasis. VI. Influence of Bacterial Antigens in Complement-Fixation Tests on Normal Sera tested with Antigens from Various Amoebae and from their Associated Bacterial Flora**] *Riv. di Parassit.* Rome. 1960, Dec., v. 21, No. 4, 249–66, 2 figs. [17 refs.] English summary.

The authors have taken 1,653 specimens of blood serum from "normal" subjects and tested them for complement fixation, following Kolmer's technique,

against 11 amoebic antigens and 11 bacterial antigens. The former were prepared from 9 strains of *Entamoeba histolytica*, 1 strain of *E. invadens* and 1 of *E. moshkowskii*; the other antigens were derived from the bacterial flora which was associated with each strain of amoeba. The authors also carried out similar tests using polyvalent antigens which they made up by mixing together the 11 amoebic and the 11 bacterial antigens respectively.

They obtained a positive reaction, indicating the presence of antibodies, against *E. histolytica* with 7·44% of these blood sera from normal subjects and against *E. invadens* and *E. moshkowskii* with 7·09%. Besides showing this distinction in specificity, the results of these tests also suggested a variation in antigenic structure in the antigens obtained from the separate strains of *E. histolytica*. The authors advise that antigens for the serological investigation of amoebiasis should be made up with a mixture of strains.

They obtained no positive results by using bacterial antigens for the complement-fixation tests and they consider that these associated bacteria do not affect the serological properties of the amoebic antigens in any way.

J. Cauchi

PAREKH, J. G. & PATEL, B. D. **Clinical Trial of a Phenanthroline Quinone in the Treatment of Amoebiasis.** *J. of J. J. Group Hosps. & Grant Med. College*. Bombay. 1960, Oct., v. 5, No. 4, 263–70. [16 refs.]

Entobex (Ciba 11,925C) [this *Bulletin*, 1957, v. 54, 1083; *et seq.*] was given for 10 days to 135 patients in India who were passing *Entamoeba histolytica*, either vegetative or cystic, in the stools. Some of them were treated concurrently with enterovioform. The stools were examined usually on alternate days during the treatment, and subsequently 2 weeks, a month, and 2 months later. Of 96 patients so followed it is claimed on these criteria that 77% were relieved of their symptoms and cured of their infections. There were no toxic side effects.

A. R. D. Adams

PONTES, J. F., KUSMINSKY, N. & PODOLSKY, W. Tratamento da amebiase intestinal por um derivado da dicloroacetamida (clorofenoxamida). [**Treatment of Intestinal Amoebiasis with Chlorophenoxamide**] Reprinted from *Rev. Brasileira Gastroenterologia*. 1959, Sept.–Oct., v. 11, No. 5, 177–82. [21 refs.]

The authors, from the University of São Paulo, Brazil, discuss the literature on chlorophenoxamide [Mebinol] with which readers of this *Bulletin* are familiar. They then describe the treatment of 25 patients with *Entamoeba histolytica* infection, all over the age of 12 years: 13 had diarrhoea, 8 had predominantly dyspeptic symptoms, 2 had chronic enterocolitis with superimposed dysentery and 2 had dysenteric ulcers.

Initially, 5 patients received 1·5 gm. of the drug daily in 3 divided doses, for 10 days: but as cysts of *E. histolytica* persisted in 2 of them, the remaining patients in this series were given a second course in the same schedule, 7 to 10 days after the first.

Stool examinations (3 specimens) were made 10 and 45 days and sometimes later after treatment. All patients became parasitologically negative at the end

of this time, except one who harboured both *E. histolytica* and *Endolimax nana* in the stools: this patient received another course of treatment and both parasites disappeared from the stools. Side effects (nausea, abdominal pains, diarrhoea) were few, mild and transient.

In the patients with amoebic ulcers, the lesions disappeared in 10 days.

H. J. O'D. Burke-Gaffney

RUDICH, A. **Treatment of Intestinal Amebiasis and of Chronic Colitis with a New Bacterial Antibiotic ("Colisan").** [Miscellanea.] *Acta Tropica.* Basle. 1961, v. 18, No. 1, 61–6.

The antibiotic, Colisan, was isolated in 1945 from a mutant (RB-103) of the *Bacterium brevis* group recovered from the mesenteric glands of a patient who died from paralytic ileus. It was found to exert a lytic action on some protozoa, including *Entamoeba histolytica.* It also showed antispasmodic action on the smooth muscle of the bowel [this *Bulletin*, 1960, v. 57, 1171].

34 patients with colitis were treated orally with tablets of Colisan, each containing 5 mgm. of the material. The dosage was from 3 to 6 tablets daily over 10 to 20 days; in some cases the treatment was repeated. 14 of these patients had chronic amoebiasis (parasitically proven); 5 had acute amoebiasis (*idem*); 8 had a colitis suspected to be amoebic in origin, but not proved to be such; one had a chronic ulcerative colitis; and 6 suffered from indeterminate abdominal symptoms. The treatment in all cases was followed by marked reduction of the intestinal symptoms and improvement in the sigmoidoscopic appearances and in the consistence of the stools. It is stated that in 9 patients with established *E. histolytica* bowel infections parasites could not be found in the stools at the end of treatment or again on re-examination 3 months later. Some others were similarly rendered stool-negative after repetitive treatments.

Minor side effects in the form of nausea, diarrhoea or constipation, abdominal pain and skin irritation attended the use of the drug in some cases; one patient developed slight oliguria.

The author considers that Colisan is an important addition to the anti-amoebic armamentarium [though to the abstracter the evidence presented inadequately sustains this view].

A. R. D. Adams

KOPERBERG, P. L., RIJPSTRA, A. C. & SWELLENGREBEL, N. H. *Isospora hominis*, een onbelangrijke, maar ongewone darmparasiet in de mens. [*Isospora hominis*] *Nederl. Tijdschr. v. Geneesk.* 1961, Mar. 25, v. 105, No. 12, 579–82, 8 figs.

The English summary appended to the paper is as follows:—

"The authors describe a case of lambliasis, with continued evacuation of cysts after an apparently successful treatment with mepacrin. Eventually, these cysts were identified as isolated sporocysts of *Isospora hominis*."

RELAPSING FEVER AND OTHER SPIROCHAETOSES

DJANBAKHSH, B. & ZEINI, A. **Determination of Susceptibility of *Ornithodorus tholozani* to Gamma-B.H.C. by the Use of Microloop.** *Acta Med. Iranica.* 1959, Sept., v. 3, No. 1, 29–33.

The topical application technique described involves the transfer of acetone solutions of gamma BHC to the cephalothorax of the tick by means of calibrated microloops. Results are given separately for nymphs, males and females of *Ornithodoros tholozani* collected from stables in Iran and exposed to 4 concentrations of the insecticide with the use of two sizes of microloop. Mortality readings were made 1, 2, 3, 5 and 7 days after treatment; most of the mortality appeared within 48 hours of the application.

[The LC 50 derived from the use of the smaller microloop is nearly twice that derived from the use of the larger one. More consistent results might result from the use of a less rapidly evaporating solvent such as ethanol or kerosene.] *G. Davidson*

LEPROSY

In this section abstracts are arranged as far as possible in the following order:—epidemiology, aetiology, pathology, diagnosis, clinical findings, treatment, control.

DE SOUZA-ARAUJO, H. C. **Leprosy.** A Reprint of the Survey made in 1924–1927. *Med. J. Malaya.* 1960, Sept., v. 15, No. 1, 33–42.

STEVENSON, C. J. **Leprosy: a Review of 79 Patients seen in London.** *Brit. Med. J.* 1961, Apr. 1, 925–8. [11 refs.]

An account is given of 79 patients with leprosy seen at St. John's Hospital for Diseases of the Skin in London. Of these 8 had been born in England but had worked in endemic countries, 42 were from India, 6 from Cyprus, 4 from West Africa, 4 were Anglo-Burmese. Smaller numbers came from 8 other countries. 24 had been originally diagnosed in the country of origin, while of the remaining patients 31 had developed symptoms after arrival in Great Britain.

Regarding indigenous leprosy: 2 cases are mentioned in Great Britain and 3 in Dublin during the last century, and 3 have been described as originating in Great Britain in the present century. [The abstracter saw another case some years ago where contact of a wife with her infectious husband had produced a tuberculoid lesion.]

Acid-fast bacilli were found in the skin in one-third of the 79 patients mentioned. The fact that leprosy does not spread from these infective patients is attributed to the high resistance of the adult population, and to the need of close contact for the spread of infection. The clinical features are discussed.

Ernest Muir

ELLIS, B. P. B. **Four Surveys of Leprosy in the Lango District of Uganda.** *Leprosy Review.* 1961, Apr., 103–7, 1 fig. on pl. & 1 map.

The Lango District is divided into 7 counties, with population varying from 94 thousand to 24 thousand each. Smaller divisions are sub-counties and parishes. Chiefs are salaried, but there are also unsalaried leaders chosen by the people who have intimate knowledge of the people. From them full particulars of the population is first gained, and with their help health inspectors tour the area. In this survey by a team of medical officers and health inspectors 4,686 people were inspected for leprosy and 135 sufferers were found, the incidence being between 23 and 34 per thousand. In one survey the lepromatous rate was 19%, and in another the child rate reached 43%. *Ernest Muir*

BAYLET, R., CAMAIN, R. & BASSET, A. Tentative de culture de bacilles de Hansen sur cellules de rein de singe. [**Attempts to Cultivate Hansen Bacillus in Monkey Kidney Cells**] *Bull. Soc. Path. Exot.* 1960, Sept.–Oct., v. 53, No. 5, 836–41, 2 figs. on pl.

Leprosy bacilli were obtained from fresh leproma by grinding and trypsinization, and then inoculated into 10-day-old cultures of cynomolgus monkey kidney cells growing in Hanks-Parker medium enriched with 3% foal serum.

The cells became vacuolated, and when stained the vacuoles were seen to contain many granular and non-granular acid-fast bacilli, some in the form of globi; many of the cells resembled the histiocytes of the Virchow type. When heat-killed bacilli or bacilli stored for 30 days at 40°C. were added to the cultures, the bacilli also became intracellular, indicating that the process was one of phagocytosis.

During the first 15 days of the culture, counts made on slides showed that the number of bacilli had increased 3 times without morphological change, but in a subculture made on the 7th day there was no evidence of multiplication.

S. R. M. Bushby

CHAUSSINAND, R. **Classification of Leprosy.** *Leprosy Review.* 1961, Apr., v. 32, No. 2, 74–81.

In spite of the fact that it is almost 90 years since the discovery of the leprosy bacillus, leprologists are still searching for an acceptable classification of leprosy. There are at present 4 primary classifications in existence: that of Madrid, the Indian, the Japanese, and that of Cochrane.

In making his suggestions the author lays down 2 principles: (1) each case should be classified as it is at the time of examination, not according to what it has been or is becoming; (2) classification should be consistently based on the histological condition which does not of course necessarily imply histological examination in each case. This would exclude such terms as maculo-anaesthetic and polyneuritic. The former of these terms can sometimes be applied to tuberculoid and to lepromatous cases; patients with the latter condition can generally be classified as lepromatous, tuberculoid or indeterminate by the Mitsuda reaction or even by a small nerve biopsy.

In the author's suggested classification, *borderline* cases are added to tuberculoid in a fourth subclass after *atypical, minor,* and *major.* Lepromatous cases are divided into *figurate* and *diffuse,* the figurate being again subdivided into *papular, macular, nodular,* and *infiltrated.* Indeterminate cases are divided according to whether they are *macular* (with a query) or are *hypopigmented, erythematous* or *hyperpigmented.*

[This article works out the classification in a logical manner and should be carefully studied in the original by all who are interested in leprosy.]

Ernest Muir

MONTESTRUC, E. Comportement différent des sexes vis-à-vis de l'infection lépreuse. Considérations bactériologiques. [**Sex Differences in Response to Leprous Infection**] *Rev. Méd. et Hyg. d'Outre-Mer.* 1961, Mar. 15, v. 33, No. 296, 38.

It is generally accepted that leprosy is more frequent, and more malignant in its form, in men than in women. Also, in lepromatous and borderline cases there is a heavier infection in men. This is illustrated by reference to leprosy patients seen in Martinique during the last 6 years. 62% of the 199 patients with lepromatous and borderline disease were men and only 37·6% women, whereas of the 655 patients with the tuberculoid and indeterminate (comparatively mild) forms, 46·5% were men and 53·5% were women. It was also found that the duration of treatment before bacteriologically negative results were obtained was longer in men than in women; this amounted to an average of 4½ months for women and 7 months for men in the case of the nose, while 9 months were required for women and 13 months for men before the skin was sterilized. It is considered that the difference between the sexes in this respect is dependent on the hormonal system.

Ernest Muir

TERENCIO DE LAS AGUAS, J. Lesiones cutáneas de estructura tuberculosa en enferma de lepra. [**Cutaneous Lesions of Tuberculous Structure in Leprosy**] *Rev. "Fontilles".* Alicante. 1960, July–Dec., v. 5, No. 2, 113–25, 3 figs. on pl. [24 refs.] English summary.

The author describes in detail the history of a Swedish patient admitted in the year 1951 to the Fontilles leprosarium at the age of 26, who had contracted leprosy seven years previously. Skin and mucosa were positive for lepra bacilli, and the case was classified as lepromatous.

The patient became bacteriologically negative under sulphone treatment in 1953. In 1957, after oral BCG, the Mitsuda reaction was still negative. In 1959 an injection of BCG produced local ulceration which healed in 3 months. In 1960 lenticular nodules appeared on the forearms with red infiltration at the bend of the elbows, which developed into ulceration. This was followed by constitutional signs: fever and loss of appetite, and enlargement of lymph nodes. Examinations of the respiratory and circulatory systems were negative. The Mitsuda reaction became positive. Examination of the lesions of the arms by biopsy showed intense epithelial hyperplasia, dense infiltration of the dermis with epithelioid and giant cells in round follicular foci, and abundant necrosis through

caseation. Injection of material into guineapigs gave negative results. Similar lesions appeared in the skin in different parts of the body, and also non-inflammatory cicatricial fibrosis of the conjunctiva. This whole condition healed up under treatment with streptomycin and isoniazid.

It is considered that the patient suffered first from leprosy, and later from an unusual form of cutaneous tuberculosis following the administration of BCG.

Ernest Muir

PRICE, E. W. **Plantar Ulcer in Leprosy: a Review of the Literature, 1890–1960.** *Leprosy Review.* 1961, Apr., v. 32, No. 2, 108–16. [Numerous refs.]

TERENCIO DE LAS AGUAS, J. & CONTRERAS RUBIO, F. Un caso de enfermedad de Hodgkins simulando lepra. [**A Case of Hodgkin's Disease Simulating Leprosy**] *Rev. "Fontilles".* Alicante. 1960, July–Dec., v. 5, No. 2, 151–6, 4 figs. on 2 pls. English summary (8 lines).

TERENCIO DE LAS AGUAS, J. Epiteliomas en enfermo de lepra. [**Epitheliomata in a Patient with Leprosy**] *Rev. "Fontilles".* Alicante. 1960, July–Dec., v. 5, No. 2, 165–8, 2 figs. on pl. [12 refs.] English summary.

[See this *Bulletin*, 1957, v. 54, 1320.]

ANDRÉ, L. J. Étude de l'action de la diamino-diphénylsulfone sur la falciformation des hématies. [**Action of DDS on Sickling**] *Méd. Trop.* Marseilles. 1961, Jan.–Feb., v. 21, No. 1, 59–61.

The author [this *Bulletin*, 1958, v. 55, 51] had previously taken part in a study of the incidence of sickling in people with leprosy (untreated) and normal subjects, finding a lower incidence in the former. Wishing to extend this work, he tested a number of leprosy patients under treatment, using the Emmel test read at 48 hours.

He now found that in a population where the general sickling rate was 13·5%, 465 leprosy patients showed a rate of less than 1%. He observed that the tests had been done 12 hours after each subject had received a dose of 600 to 800 mgm. of diamino-diphenyl-sulphone (DDS). In a second series of 500 leprosy patients, the sickling rate was 12·2% before, and 3·8% after a dose of DDS. 2 normal sickling subjects were then given 600 mgm. of DDS. The sickling test became negative 8 hours later, and remained so until the 4th or 6th day after taking the drug.

Another worker is quoted [without reference] as having found this effect in trait carriers but not in sickle-cell anaemia patients.

It is noted that the time relations of this effect correspond with the known facts regarding the persistence of DDS in the body, but no further explanation is offered.

Alan B. Raper

EKAMBARAM, V. & SHARMA, C. S. G. **Treatment of Reactions in Leprosy by Aqueous Sulphetrone Injections and Oral INH in a Rural Centre.** *Leprosy Review.* 1961, Apr., v. 32, No. 2, 88–90, 16 figs.

Treatment was observed in 15 patients of whom 9 were also suffering from lepra reaction. They were given daily 0.5 ml. of a 50% solution of Sulphetrone [solapsone] in water by parenteral injection, and orally 150 mgm. daily of isoniazid. The results were particularly good in the reactive cases, the reaction being controlled without injury to the nerves. In non-reactive tuberculoid patients clinical improvement appeared to be quicker than with ordinary sulphone treatment. In non-reactive lepromatous patients the results were slow and this treatment is not recommended. Results before and after in 8 patients are illustrated by photographs. *Ernest Muir*

MAJUMDAR, S. **Chloramphenicol Therapy in Reactional Leprosy.** *Leprosy Review.* 1961, Apr., v. 32, No. 2, 85–7.

The author gives his experience in 17 cases of leprosy, in which the patients were suffering from severe reaction, and in which the condition yielded promptly to chloramphenicol in the twice-daily dose of 1 capsule. This was administered for 5 to 6 days; the temperature usually subsided on the first or second day and other symptoms within 4 to 6 days. In 7 of these patients potassium antimony tartrate had previously been tried but had failed to improve the condition.

Ernest Muir

CONTRERAS DUEÑAS, GUILLÉN PRATS & TERENCIO DE LAS AGUAS. Primeros resultados del tratamiento de la lepra con Madribon. [**Preliminary Results with Madribon in the Treatment of Leprosy**] *Rev. "Fontilles".* Alicante. 1960, July–Dec., v. 5, No. 2, 173–5.

The English summary appended to the paper is as follows:—

"Sulphadimetoxine (Madribon) has been used in four Leprosy patients of the L type. Improvement was clinically observed in all, negativization in one case and favorable bacteriological changes in two others.

"Tolerance on the used doses—two pellets—were good. On the erysipelatous reactions, it was especially efficient."

TARABINI CASTELLANI, G. & MARINO, G. Tratamiento de la úlcera perforante hanseniana con el Madribon. [**Treatment of the Leprous Perforating Ulcer with Madribon**] *Rev. "Fontilles".* Alicante. 1960, July–Dec., v. 5, No. 2. 145–50. English summary.

An account is given of the treatment of 50 leprosy patients, who had between them 72 perforating ulcers of the extremities, with Madribon (2,4 dimethoxy-6-sulphanilamido-1, 3-diazine). The patients were given 0·5 gm. daily for 6 days a week for a period of 3 weeks.

As a result 25% of the ulcers were cured, 50% were very much improved, 18% made less improvement, and 5·5% remained stationary. It is argued that if the treatment had been more prolonged even better results might have been obtained. *Ernest Muir*

JAMISON, D. G., PALMER, E. & VOLLUM, R. L. **Preliminary Trial with Etisul in Northern Nigeria.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1961, Mar., v. 55, No. 2, 142–8, 19 figs. (8 coloured on pl.)

4 patients with advanced lepromatous leprosy were treated with a combination of oral DDS and percutaneous Etisul. Etisul, supplied in 5-gramme tubes, was rubbed into the thighs and legs by the patients themselves.

In the first patient the burning sensation diminished in the first 3 weeks. After 4 months' treatment there was reduction of the infiltration and bacilli showed granularity. In the second patient there was dramatic reduction in the infiltrate and number of bacilli after 4 months' treatment. In the third patient cortisone was given to prevent reaction, and there was soon a marked improvement in his general condition; there was progressive reduction in the lepromatous infiltrate. "The most striking histological feature of the last biopsy was the replacement of the typical lepromatous infiltrate by a large number of fibroblasts." In the fourth patient, 4 months after the onset of Etisul treatment, there was very marked reduction in the amount of lepromatous infiltrate, the number of bacilli was reduced, and they were all granular in appearance.

It is concluded that:

"Intensive treatment with Etisul rubbed in all over the body for from 3 to 4 months with concurrent and subsequent D.D.S. treatment may prove to be the optimum.

"Reactions were seen in the children who received large doses of Etisul, and treatment may have to be temporarily discontinued in such cases".

Ernest Muir

HURMAN, J. E. J. **Mkunya: an Experiment in Leprosy Control.** *Leprosy Review.* 1961, Apr., v. 32, No. 2, 91–102. [12 refs.]

This is the account of an anti-leprosy scheme in the Southern Province of Tanganyika which was conducted over a period of some 5 years, but owing to various causes has not succeeded as was hoped. Comparisons are made with similar more successful schemes elsewhere and the reasons for failure are pointed out.

It is felt that too little attention has been directed towards leprosy in the past, and that for two main reasons. First, the low mortality rate, and the failure to recognize the disablement caused by the neural form of the disease, have placed it low in the priorities of international health control programmes. Second, the study of this disease is attractive to few of the medical profession.

". . . The planning of local control measures must be based on accurate incidence trends, so that the resulting treatment schemes are not overloaded, and hampered by financial and staffing shortages. The conduct of such surveys, and the general overall supervision of the control measures instituted, should remain

the responsibility of the national health service." It is acknowledged that the help of voluntary agencies and Missions is urgently needed, " but should be directed under a national policy and under closer national supervision and co-ordination ". *Ernest Muir*

YANAGISAWA, K. & ASAMI, N. **Studies on the Lepromin Test. Sensitization of Guinea Pigs with Human Leprosy Bacilli separated from Leprous Nodules by Trypsin Digestion.** *Japanese J. Microbiol.* 1959, Oct., v. 3, No. 4, 443–53, 6 figs. [14 refs.]

In some previous experiments (*Lepra,* 1956, v. 25, 192) the authors failed to sensitize guineapigs with lepromin prepared by the Dharmendra method in which chloroform is used to concentrate the leprosy bacilli, but in the present paper they report successful sensitization by immunizing with bacilli concentrated by treating lepromas with trypsin. [A detailed flow-sheet of the method is given.]

3 mgm. and 15 mgm. of the bacilli suspended in Freund adjuvant and 3 mgm. in the adjuvant plus 2 mgm. of purified tubercle bacillus wax, were injected into guineapigs, and sensitivity tests with the leprosy bacilli and with 1 : 100 OT were done at intervals. The results showed that sensitivity to lepromin developed 3 weeks after injection as shown by an area of erythema of about 15 mm. in diameter at 24 hours, but which decreased somewhat in size by 48 hours; the animals were also sensitive at this stage to tuberculin but to a lesser extent. Sensitization was slightly greater in the animals immunized with 15 mgm. than in those given the 3 mgm. dose, but the strongest reactions occurred in those immunized with the bacilli suspended in the tubercle bacilli wax. After 18 weeks the sensitivity tests reached a maximum at 10–24 hours but whereas the lepromin reactions were still positive after 7 days, the tuberculin reactions disappeared by the 5th day.

The authors maintain that these successful results should contribute much to the future studies of potency tests of lepromin antigen, and the specificity and immunological relations between leprosy and tuberculosis. *S. R. M. Bushby*

HELMINTHIASIS

In this section abstracts are arranged as far as possible in the following order:—TREMATODES (*schistosomes, other flukes*); CESTODES (*Diphyllobothrium, Taenia, Echinococcus, other cestodes*); NEMATODES (*hookworms, Ascaris, filarial worms, Dracunculus, etc., Trichuris, Enterobius, Trichinella, etc.*).

LEIKINA, E. S. **Natural Foci of Infection of some Helminthiases.** *Pub. Health Rep.* Wash. 1961, Mar., v. 76, No. 3, 263–72. [Translated from Russian *Med. Parasit. & Parasitic Dis.* 1957, v. 26, No. 2, 140–52.]

A review and discussion.

FERRETTI, G. & CORTINI, M. Importanza dei metodi di indagine per lo studio dell'incidenza delle elmintiasi intestinali e considerazioni sulla loro diffusione nelle comunità ebraiche dell'Iran. **[Importance of Investigation Techniques for the Study of Intestinal Helminthiases and Observations on their Spread in Iran among Jewish Communities]** *Parassitologia.* Rome. 1960, Dec., v. 2, No. 3, 407–10.

The authors have examined 183 specimens of faeces, 137 from adults and 46 from children, taken from Jewish residents of Iran and flown to their laboratory in Rome. They followed WATSON's technique of flotation with a solution of sodium nitrate [this *Bulletin*, 1947, v. 44, 856] which has a higher specific gravity than the saturated solution of sodium chloride which BIOCCA used in a previous, similar investigation [*ibid.*, 1960, v. 57, 253]. The authors applied also Biocca's method to the specimens and they give their findings in a table for comparison. More helminth eggs were collected by Watson's technique and some of the helminth infections were missed when Biocca's method was followed.

There are tables analysing the incidence of the various species, and of the combined infections, as between adults and children. There were eggs of *Ascaris lumbricoides* in 97% of the specimens, *Trichuris trichiura* in 69% and species of *Trichostrongylus* in 75%, and also several multiple infections.

J. Cauchi

HSIEH, Hsien-Chen. **Outline of Parasitic Zoonoses in Taiwan.** Reprinted from *Formosan Sci.* 1959, v. 13, No. 3, 99–109. [58 refs.]

In Taiwan there are more than 70 species of human parasites, of which 50 are said to be intercommunicable between vertebrate animals and man. The most important of these are *Clonorchis sinensis, Fasciolopsis buski, Paragonimus westermani, Metagonimus yokogawai, Taenia saginata, T. solium, Ancylostoma duodenale* and *Necator americanus. Schistosoma japonicum* has been found in various animals, particularly in dogs, but no human infection has as yet been recorded in Taiwan, though this is quite common on the Chinese mainland.

Brief notes are included in the paper on each of the parasitic zoonoses recorded in the island.

G. Covell

WALLACE, H. R. **The Bionomics of the Free-Living Stages of Zoo-Parasitic and Phyto-Parasitic Nematodes—a Critical Survey.** *Helminthological Abstracts.* 1961, Mar., v. 30, Pt. 1, 1–22, 7 figs. [Numerous refs.]

CLAUGHER, D. **The Transport and Laboratory Culture of Snail Intermediate Hosts of** *Schistosoma haematobium.* *Ann. Trop. Med. & Parasit.* 1960, Oct., v. 54, No. 3, 333–7. [13 refs.]

The importance of laboratory studies in schistosomiasis has stimulated the need for the maintenance of experimental colonies of the intermediate hosts, and

this paper describes the methods which have been found successful for species of *Bulinus*.

The snails appear to thrive best in aquaria with conditioned water and plants but without other animals. The optimum temperature for most of the species is about 26°C. but some need slightly higher temperatures to stimulate breeding. The most readily accepted food is lettuce which has been scalded in boiling water for about two minutes, then cooled in cold water and spread out on glass sheets in a warm room to dry; then the lettuce can be stored in a dry place for an indefinite period after this treatment. To remove harmful pests from the colonies the snails are narcotized in a 2% solution of urethane for about 2 hours and then carefully cleaned with a fine paint brush before being transferred to fresh tanks with conditioned water, sterilized sand and plants which have also been cleaned by washing for about 12 hours in 2% urethane. *C. A. Wright*

HANDFORD, S. W. **Blood Ammonia Levels in Patients with Advanced Hepatic Fibrosis associated with Schistosomiasis.** *Amer. J. Trop. Med. & Hyg.* 1961, Jan., v. 10, No. 1, 33–6, 2 figs. [10 refs.]

Determinations of the blood chemistry were undertaken in 29 patients in Egypt suffering from the terminal stage of schistosomiasis with advanced liver and spleen involvement. Blood NH_3–N, urea, glutamine and keto acids in the blood of these patients were estimated and the results were compared with similar estimations performed on control patients who were either clinically well or suffering from brucellosis or from multiple parasitic infections, including schistosomiasis. After a summary of the techniques employed, the relevant data are set out in tables.

No direct relationship was found between schistosomal invasion of the hepatic portal system, and its sequelae, and the results of the biochemical estimations; the latter were not significantly different from those obtained in the control patients. *A. R. D. Adams*

HIGAZI, A. M., FAHMY, A. R. & KADDAH, S. **Serum Glutamic Oxalacetic Transaminase in Hepatic Bilharziasis.** *J. Egyptian Med. Ass.* 1960, v. 43, No. 12, 923–8.

The estimation of serum glutamic oxalacetic transaminase (SGOT) has been used to discover tissue damage, particularly in the heart and liver. Cell necrosis occurring in these organs releases SGOT into the serum.

The authors have studied in Egypt the value of this test in hepatic schistosomiasis. In normal controls the range of units was 6–32, in hepatic schistosomiasis (15 patients with early schistosomiasis) 50–160, but in 15 patients with ascites and therefore chronic cirrhosis, the range was 11–50 units.

The results are interpreted as showing that the acute condition in which cell deterioration occurs is associated with a rise in SGOT, but in advanced cirrhosis there should be little active process of cell necrosis. The enzyme is an index of liver cell injury and not of liver function. *H. Lehmann*

SALEM, H. H., EL SHERIF, A. F., FRIEDHEIM, E. H., RABBO, H. A. A. & ABDOU, A. H. **A Preliminary Report on the Suppressive Management of Schistosomiasis by Monthly Injection of TWSb.** *J. Egyptian Pub. Health Ass.* 1960, v. 35, No. 3, 95–9.

TWSb stops the production of viable schistosome eggs in animals, but the production is resumed after 6 weeks or so if no further injections are given. The authors, from Alexandria, were encouraged by the disappearance of fertile schistosome eggs in 600 cases in which TWSb was used. They therefore tried the use of this drug as part of a suppressive scheme on the inhabitants of a farm in Sharkia Province, Egypt. FRIEDHEIM and DE JONGH had already carried out a similar study [this *Bulletin*, 1960, v. 57, 382]. 157 of these inhabitants were examined and TWSb was given to 147 whether they were infected with schistosomes or not. The drug was given as a 10% solution in doses varying from 2–5 ml. according to age (3 to 70 years). A month later the urine was examined again and a second injection was given and this was repeated for 2 further months.

The percentages of urines harbouring *Schistosoma haematobium* eggs were as follows:—

First injection	50·3
1 month later	9·6
1 month after second injection	4·5
1 month after third injection	3·2

Evidently the drug was affecting the egg-laying capacity of the female worm and the viability of the eggs. In most patients urinary symptoms also improved.

The authors publish this preliminary note because of the promising results. It may be that further injections would stop egg production altogether or kill the worms, and it is conceivable that this drug applied on a large scale together with other measures, might bring the control and eradication of the disease nearer. *H. J. O'D. Burke-Gaffney*

PIZA, J. de T. & RAMOS, A. da S. Os focos autóctones de esquistossomose no Estado de São Paulo. [**Autochthonous Foci of Schistosomiasis in the State of Sao Paulo, Brazil**] *Arquivos de Hig. e Saúde Pública.* São Paulo. 1960, Dec., v. 25, No. 86, 261–71, 1 map & 2 figs. [27 refs.] English summary.

BURCH, J. B. **Chromosome Numbers of Schistosome Vector Snails.** *Ztschr. f. Tropenmed. u. Parasit.* Stuttgart. 1960, v. 11, No. 4, 449–52, 8 figs. [15 refs.]

In a search for additional taxonomic characters in the planorbid intermediate hosts of schistosomiasis the author has investigated the chromosome numbers in four species. The haploid number is 18 in *Australorbis glabratus* and *Biomphalaria sudanica* and 36 in *Bulinus truncatus* and *B. ugandae*. It is suggested that the bulinids are probably tetraploids and that polyploidy is more common in the freshwater pulmonate snails than was formerly thought. The existence of this polyploidy is helped by the self-fertilizing hermaphrodite nature of the snails.

[The author has used the generic name *Planorbina* for *Biomphalaria* and

Australorbis because it is the oldest of the available names for this group but the case is at present before the International Commission on Zoological Nomenclature and to avoid unnecessary confusion the better known names have been used here.] *C. A. Wright*

MICHELSON, E. H. **The Effects of Temperature on Growth and Reproduction of *Australorbis glabratus* in the Laboratory.** *Amer. J. Hyg.* 1961, Jan., v. 73, No. 1, 66–74, 5 figs. [23 refs.]

Experiments on the snail *Australorbis glabratus* have shown that temperatures of 5°C. and 35°C. are lethal after exposure for several days. At 30°C. growth is accelerated but egg-laying is reduced and prolonged maintenance at this temperature results in at least partial destruction of the accessory female reproductive organs and repression of the female gonadial tissue. Maintenance at 15°C. and 20°C. retards growth and limits reproductive activity but evidence suggests that subsequent warming to the optimum (25°C.) temperature after a period in the lower ranges actually stimulates egg-laying. *C. A. Wright*

CHERNIN, E. **Infection of *Australorbis glabratus* with *Schistosoma mansoni* under Bacteriologically Sterile Conditions.** *Proc. Soc. Exper. Biol. & Med.* 1960, Nov., v. 105, No. 2, 292–6, 1 fig.

Previous papers have described the methods of rearing bacteriologically sterile snails [this *Bulletin*, 1958, v. 55, 543]. These snails have been successfully infected with miracidia recovered under sterile conditions from eggs in the livers of infected mice. By continued maintenance of the exposed snails under sterile conditions it is possible to obtain sterile cercariae for use as antigens or for studies on *in vitro* cultivation. An observation of interest arising out of this work is that the miracidia of *Schistosoma mansoni* can successfully penetrate into *Australorbis glabratus* in total darkness. *C. A. Wright*

BARRETTO, A. C. **Natural Infection of Sewer Rat (*Rattus norvegicus*) with *Schistosoma mansoni*, in the City of Salvador, Bahia.** *Bol. Fundação Gonçalo Moniz.* Bahia. 1959, Mar., No. 14, 7–12. [15 refs.]

Natural infection of various mammal species with *Schistosoma mansoni* has been well established, and in Brazil such infections have been found in the States of Alagoas [this *Bulletin*, 1954, v. 51, 1267], Pernambuco [*ibid.*, 1954, v. 51, 605; 1956, v. 53, 1251; 1959, v. 56, 177, 1157] and Minas Gerais [*ibid.*, 1956, v. 53, 898].

The present author now records infection of 7 of 12 *Rattus norvegicus* in Bahia. They were taken in a suburb of Itapagipe, Salvador, some of them in the yards of houses near sewer ditches containing infected snails. Adult worms were sought in the liver and mesentery of the rats at autopsy and ova were looked for in the faeces and in crush preparations of liver and rectum. One animal harboured 32 male and 1 female worms; in the others infections were mild, but males predominated and occasionally only males were found. 3 animals had

unisexual and 4 bisexual infections. In all the bisexual infections, eggs were found in the liver, but not in the rectum; in only one case was an egg found in the faeces.

The high degree of infection and the semi-aquatic and semi-domestic habits of the rats (which were also seen to eat snails) make *R. norvegicus* suspect as being able to maintain the life cycle of *S. mansoni*. The scarcity of the eggs in the faeces is attributed to the prominence of infections by male worms. Further studies are required to determine whether such rodents can in fact act as reservoir hosts of *S. mansoni*. *H. J. O'D. Burke-Gaffney*

BOURNS, T. K. R. **Schistosome Cercaria in Ontario.** *Canadian J. Zool.* 1961, Feb., v. 39, No. 1, 43–6. [10 refs.]

"Cercariae of *Schistosomatium douthitti* (Cort, 1914) Price, 1931 have been obtained from 92 of 2,474 *Lymnaea stagnalis appressa* Say and *L. palustris elodes* Say collected from nine locations in central and western Ontario from 1957 to 1960. This is believed to be the first published record of the occurrence in Canada of this schistosome dermatitis-producing parasite. A second schistosome, *Trichobilharzia ocellata* (La Valette, 1855) Brumpt, 1931, was found in *Lymnaea stagnalis appressa* Say from two locations."

DARRAS, T., FAIN, A., MOENS, E., ROBBERECHTS, W., SEGHERS, K. & VAN DE PITTE, J. Een nieuw Congolees geval van longparagonimose. [**A New Case of Paragonimiasis in the Congo**] *Ann. Soc. Belge de Méd. Trop.* 1960, Oct. 31, v. 40, No. 5, 725–31. [20 refs.]

The English summary appended to the paper is as follows :—

"After a resumé of the parasitological and clinical facts about paragonimiasis in Africa, the authors describe a personal case which simulated tuberculosis."

[See this *Bulletin*, 1958, v. 55, 69.]

KHOO OON TEIK. **Experiences in the Treatment of Paragonimiasis with special reference to Chloroquin.** *J. Trop. Med. & Hyg.* 1961, Mar., v. 64, No. 3, 53–60, 3 figs. [20 refs.]

In 1955–6 in Singapore 9 patients were found to have paragonimiasis. Almost certainly they had been infected in Japan. The following chemotherapy was tried in an endeavour to clear these infections. 5 patients were given emetine injections (1 grain daily) for 6 days, followed after 3 days by 5 to 9 Stibophen injections, and then chloroquine for from 14 to 323 days. 2 patients were treated with tetracycline and chloroquine followed by Nilodin [lucanthone], pentostam [sodium antimony gluconate] and chloroquine over several months; the remaining 2 patients were treated with tetracycline, chloroquine and diethylcarbamazine. 5 of the patients had chloroquine for up to 2 months and the other 4 had it over longer periods. In no case was parasitic eradication achieved; ova were present in the sputum of each patient after treatment, though during emetine treatment they consistently vanished from it for a time.

4 patients clinically and radiologically showed some improvement, 4 showed none, and the remaining patient became worse. The various combinations of drugs did not give differing therapeutic responses; they did not materially affect the course of the disease. The present drug treatment of paragonimiasis is unsatisfactory; it is suggested that Cyanocethydrazide, which is successfully used in veterinary practice against the lungworms of stock and which has been tried in human pulmonary tuberculosis [*Bull. Hyg.*, 1955, v. 30, 498], is worthy of trial in human paragonimiasis. *A. R. D. Adams*

SAAD, R. S. **Diphyllobothriasis in Finland, with special reference to Incidence, Transmission and Clinical Features.** *Med. J. Australia.* 1960, July 16, v. 2, No. 3, 94–8. [12 refs.]

This account of infection with *Diphyllobothrium latum* was written specifically for the Australian practitioner who might have to deal with Finnish immigrants. The author had previously been seconded to the Department of Immigration at The Hague, Holland. Of 68 randomly selected adults from various parts of Finland who presented for migration 10 gave histories of having been infected.

In 1959, the State Medical Board of Finland surveyed the incidence of infection, and 20% of the entire population was infected. The rate in some areas was 15% in children who had just reached school age, and rose with age to about 70%.

D. latum is transmitted to man by the pike, perch, burbot, ruff and probably the trout and char. These fish do not eat plankton but probably become infected by eating fish such as the stickleback, which spawns in freshwater in summer, and later migrates down to the sea. In freshwater lakes it forms part of the diet of the pike. A parasite of gulls, *D. osmeri*, occurs in other fish (the coregonids) and though these are eaten commonly as a delicacy it is unlikely that they are concerned in the transmission of *D. latum.*

The work of VON BONSDORFF [this *Bulletin*, 1956, v. 53, 1023] showing that the anaemia is produced by the competition of the tapeworm with the host for the uptake of vitamin B12 and NYBERG's confirmation, using vitamin B12 labelled with radio-active cobalt [*ibid.*, 1958, v. 55, 916] is reviewed, both authors stating that the position of the tapeworm in the small intestine is related to its ability to compete for vitamin B12. Treatment is by mepacrine. *W. E. Kershaw*

SCUDAMORE, H. H., THOMPSON, J. H., Jr. & OWEN, C. A., Jr. **Absorption of Co^{60}-Labeled Vitamin B_{12} in Man and Uptake by Parasites, including** *Diphyllobothrium latum.* *J. Lab. & Clin. Med.* 1961, Feb., v. 57, No. 2, 240–46. [19 refs.]

Experiments with isotope-labelled vitamin B12 in non-anaemic persons showed that certain intestinal parasites neither interfered with the host's absorption of the vitamin nor took up any significant quantity of it themselves. The parasites concerned were *Taenia saginata*, *Ascaris lumbricoides*, *Necator americanus*, *Trichuris trichiura*, and *Giardia intestinalis.*

6 patients harbouring *Diphyllobothrium latum* absorbed and excreted a normal amount of the test dose, but the expelled tapeworms were found to have

absorbed from 2·6 to 13·7% of the B12 administered. Auto-radiographs of one such worm showed that uptake was greatest in the growing segments just distal to the scolex.

Tapeworm infection in the authors' patients took place in Canada, and it is questioned whether the worms might have been of a different subspecies from those shown in Finland [this *Bulletin*, 1958, v. 55, 916; 1959, v. 56, 71] to take up a greater share of a test dose of vitamin B12; but the considerable variability between individual worms in this respect is admitted. *Alan B. Raper*

CAPRON, A. & BRYGOO, E. R. Sparganose expérimentale de *Lemur fulvus* Geoffr. [**Experimental Sparganosis in** *Lemur fulvus*] *Arch. Inst. Pasteur de Madagascar.* 1960, v. 28, 189–95.

Previous experiments on the experimental transmission of sparganosis to primates are reviewed and the results of experiments carried out by the authors show that the sparganums of *Diphyllobothrium erinacei europaei* can be transmitted and can re-encapsulate in the subcutaneous tissue after ingestion and after direct penetration of the conjunctiva in *Lemur fulvus*. *W. E. Kershaw*

LOGAN, C. J. H. **Bizarre Presentation of** *Taenia saginata* **in a T-Tube draining the Common Bile Duct.** *Ulster Med. J.* 1960, Dec. 1, v. 29, No. 2, 142–3.

A female patient aged 69 in Belfast was admitted to hospital as an emergency with acute pancreatitis, which improved with appropriate treatment. Tapeworm segments appeared in her stools during convalescence but it was decided to postpone immediate treatment. Cholecystography a month after admission revealed numerous calculi in the gall-bladder and this was subsequently removed. The common bile duct was dilated and it also contained stones, which were removed. No abnormality was seen in the duodenum, which was closed and a T-tube inserted in the common bile duct, the end being brought through a wound in the hypochondrium.

Next day, despite appropriate treatment, paralytic ileus developed and persisted for 48 hours. Ten days later, a T-tube cholangiogram showed no abnormality in the common bile duct, but the dye did not enter the duodenal end of the tube. The T-tube was withdrawn and a live tapeworm was seen to extend from the wound into the duodenal end of the tube. Some 76·2 cm. of worm was removed from the tube, the head emerging last. It was identified as *Taenia saginata.*

The author discusses the possible causes of dislodgment of the head of the tapeworm from it usual intestinal attachment. It would appear that handling at operation, post-operative paralytic ileus, the larger orifice and dilatation of the common bile duct were factors concerned. *H. J. O'D. Burke-Gaffney*

SEATON, D. R. **On the Use of Dichlorophen as a Taenifuge for** *Taenia saginata.* *Ann. Trop. Med. & Parasit.* 1960, Oct., v. 54, No. 3, 338–40, 2 figs. on pl.

Most taenifuges, for example, mepacrine and male fern, are not lethal to the parasite but cause the scolex to relax its hold, when it can be expelled by a

purge. The patient has to be deprived of solid food for some days and is given laxatives. The traditional methods of expelling a tapeworm make it an ordeal for the patient.

Dichlorophen is free from these disadvantages. It is a colourless solid with a faint taste and has a lethal action upon tapeworms, which are passed in a more or less disintegrated condition, and there is no need to submit the patient to any preliminary fasting. The drug has a slightly laxative action and when the requisite dose is taken before breakfast two or three loose motions, containing the parasite, will be passed during the next few hours. It is seldom possible to find the scolex or anterior segments so that the result of the treatment cannot be known until 3–4 months later: the time taken by *Taenia saginata* to grow from the scolex to the point at which segments are shed is always less than 12 weeks.

In previous treatments the doses of dichlorophen employed have often tended to be too low. The present series consisted to 34 patients infected with *T. saginata*. 19 were women, 11 were men, and 4 were children under 10. Eventually, after initial trial with smaller doses, the practice was adopted of giving adults 6 gm. and children no less than 4 gm. All were followed up for 4 months. Out of 21 treated with the full dose, 19 were cured. It was therefore effective in removing *T. saginata* in 90% of patients.

This cure rate is much the same as that obtainable with mepacrine combined with a severe regime of fasting and purging. This leaves no doubt that in its extreme simplicity of administration, absence of unpleasant side effects and the minimal inconvenience to the patient, dichlorophen is the best available remedy for the treatment of *Taenia saginata* and this is particularly the case in children. Of the latter one was a boy of 6 who was cured with 2 gm., the second a girl of 4 unsuccessfully treated at first with 2 gm., then with 3 gm., then with 4 gm., but eventually cured with 6 gm. Both had been unsuccessfully treated with male fern and mepacrine. The remaining children were boys of 3 and 9 and both were cured with 4 gm. *Philip Manson-Bahr*

ALLAIN, Dorothy S. & KAGAN, I. G. **The Use of Formalinized Red Cells in the Serology of Hydatid Disease.** *J. Parasitology*. 1961, Feb., v. 47, No. 1, 61–4. [11 refs.]

"Formalinized sheep red cells, sensitized with tannic acid and coated with echinococcus antigen, can be substituted for fresh cells in the hemagglutination test. Antigen-coated formalinized cells stored at 5°C. were stable for 2 weeks, and for 6 months when stored at −70°C. Antigen-coated formalinized sheep red cells freeze-dried and stored at −20°C. were satisfactory after being reconstituted for use in the hemagglutination test after 7 months of storage."

[See also this *Bulletin*, 1959, v. 56, 856.]

MANDRAS, A. & ADDIS, S. Sull'impiego di emazie formolate nella reazione di emoagglutinazione per la diagnosi di idatidosi. [**Haemagglutination Test for Hydatid Disease**] *Igiene Moderna*. 1960, v. 53, Nos. 7/8, 371–8. English summary (6 lines).

The authors have found [this *Bulletin*, 1959, v. 56, 957] that the indirect haemagglutination reaction provides a sensitive and specific test for the diagnosis

of hydatid disease, but it has the inconvenience of depending on the use of fresh and freshly sensitized red blood cells and the technique is difficult to standardize satisfactorily.

In this paper they publish their experience in the use of formolized cells for the test, following the techniques of both INGRAHAM (*Proc. Soc. Exper. Biol. & Med.*, 1958, v. 99, 452) and MCKENNA (*ibid.*, 1957, v. 95, 591). The former stores the formolized cells at 4°C. and sensitizes them as and when required, while the latter deformolizes them and sensitizes them before storing them at −20°C.

They have compared the results from the 3 methods—with fresh and with preserved cells—by testing them against 24 specimens of blood serum taken from patients known to have hydatid disease and against an equivalent number of specimens from other subjects as controls.

The preserved cells have given results which are as reliable as when fresh cells are used in the diagnosis of hydatid disease. The McKenna technique is particularly convenient and can be satisfactorily standardized. *J. Cauchi*

BASHOUR, F. A. **Hydatid Cyst of the Lung with Clubbing.** *Ann. Intern. Med.* 1961, Feb., v. 54, No. 2, 326–31, 2 figs. [19 refs.]

A case from Beirut.

LAHBABI & BENKIRAN. Un cas de kyste hydatique du rein perforé dans le péritoine. [**A Hydatid Cyst of the Kidney Perforating the Peritoneum**] *Maroc Méd.* 1961, Jan., v. 40, No. 428, 63.

BOLOT, F. Un cas de kyste hydatique de l'utérus. Maladies "kystiques" non hydatiques. [**A Case of Hydatid Cyst of the Uterus**] *Maroc Méd.* 1961, Jan., v. 40, No. 428, 62–3.

LAMBOTTE, C., BAYOKA, S., MULUNDA, L. E. & BOSILO, P. L'hydroxynaphtoate de béphénium dans l'ankylostomose du nourrisson et de l'enfant. [**Bephenium hydroxynaphthoate in Ankylostomiasis of Infants and Children**] *Ann. Soc. Belge de Méd. Trop.* 1960, Oct. 31, v. 40, No. 5, 771–81. [18 refs.]

As in so many parts of tropical Africa, hookworm infection is a serious problem in Léopoldville. The authors have been trying to find a suitable method of treating infants and young children, being unhappy in using tetrachlorethylene not only because of the age of their patients but also because of their frequently severe anaemia. They report 2 series treated with bephenium hydroxynaphthoate (Alcopar).

The first series was of 500 children found in the clinic to have hookworm ova. 169 of these were still at the breast (0–30 months of age), and 331 were older children. 118 had haemoglobin under 5 gm.%, and 225 had a lesser degree of anaemia; the remainder were not anaemic. The dosage used was 5 gm. (2·5 gm. base) for the older children, and 2·5 gm. (1·25 gm. base) for the sucklers,

given on an empty stomach. Stool examinations (direct) for ova were repeated on the fourth or fifth day, and on the seventh to tenth day. Second and even third treatments were used in those children who still had ova.

Apparent clearance was obtained in 401 (80·2%) of the 500 children with the first dose and 55 (80·9%) of 68 children with the second dose.

The second series was a more careful study of 50 children admitted to hospital because of the severity of their anaemia. Further haematological studies of these are to be published elsewhere, but the mean haemoglobin of the group was only 4 gm.% with values as low as 1 gm.%. The mean age was 12·7 months, the mean number of ankylostome ova per ml. 23,000, and the mean number of worms expelled 80·3. These were found to be mainly *Ancylostoma duodenale*. These young and anaemic infants were given 2·5 gm. of bephenium salt (1·25 gm. of base).

The first dose produced complete clearance in 29 (58%) of the 50 children, while the second dose cleared 13 of 17 remaining. The slightly lower percentage success in this second series the authors attribute to the more careful checking.

The authors sum up by stating that bephenium is remarkably effective against hookworm in infants. They regard it as definitely more effective than tetrachlorethylene, and describe its action as " elimination in more than 90% of cases of at least 90% of the ankylostomes " [abstracter's translation]. They also stress the almost complete lack of toxicity [a point upon which virtually all published work agrees] which they feel makes it the drug of choice in treating these anaemic and often malnourished children. Since its routine use was begun the length of stay in hospital of such children has dropped from a mean of 20 to 12 days, and the mortality from 3 to 1·2%.

[See also this *Bulletin*, 1960, v. 57, 924 *bis*.] *A. C. E. Cole*

PAVIOT, J. J. & NIOGUY, C. Essais d'un nouvel anthelminthique: sel de bephenium. **[Trials of a New Anthelmintic: a Salt of Bephenium]** *Bull. Soc. Path. Exot.* 1960, Sept.–Oct., v. 53, No. 5, 806–9.

The authors used bephenium hydroxynaphthoate (Alcopar) in the treatment of hookworm infection (*Ancylostoma duodenale*) in Pondichéry. The dosage was 2–3 gm. of the base first given as one dose, but then split into three daily doses to avoid the production of diarrhoea. Egg counts were made per gm. of faeces before and after treatment, the patients being kept in hospital for the whole period.

30 patients were treated. In 2 of them the faeces were cleared, and in 12 a reduction of ova of 75% or more took place. The faeces of 11 patients however failed to show any significant reduction or even showed an increased number of ova. These patients (15 in the text, 16 in the table) who were not considered to have reacted satisfactorily were treated with tetrachlorethylene in a dosage of 1 ml. per 10 kgm. weight, and the faeces of 11 (10 in the table) were cleared completely.

The authors conclude that bephenium is less effective than tetrachlorethylene. [While their results are poor compared with those claimed by GOODWIN *et al.* (this *Bulletin*, 1959, v. 56, 639) and HAHN *et al.* (*ibid.*, 1960, v. 57, 1277), others have found similar results (*ibid.*, 1959, v. 56, 750). 4 days' treatment with 5 gm. of the salt daily is now a recommended dosage.] *A. C. E. Cole*

CAMPOS, R., GAZONI, E. & DA SILVA, J. H. Incidência do *Strongyloides stercoralis* em lavradores do Litoral do Estado de São Paulo. **[Incidence of *Strongyloides stercoralis* in Labourers in a Coastal Area in Sao Paulo, Brazil]** *Rev. Paulista Med.* 1961, Jan., v. 58, No. 1, 17–18. English summary (5 lines).

The authors examined the stools of 220 plantation workers on a farm in the Caraguatatuba area in the coastal region in the north of São Paulo. A modified Baermann's technique was used [RUGAI *et al.*, this *Bulletin*, 1955, v. 52, 805]. They found that 148 (67·27%) were positive for *Strongyloides stercoralis* larvae.

H. J. O'D. Burke-Gaffney

ALCORN, M. O., Jr. & KOTCHER, E. **Secondary Malabsorption Syndrome produced by Chronic Strongyloidiasis.** *Southern Med. J.* 1961, Feb., v. 54, No. 2, 193–7, 7 figs.

Secondary malabsorption syndrome can best be distinguished from the primary type by the presence of gross pathological alterations in the gastrointestinal tract in the former. These lesions may involve the pancreas, liver, biliary tree or small intestine.

Malabsorption can be secondary to helminthic infection, such as strongyloidiasis, as in the 2 cases described. The first patient died of undiagnosed *Strongyloides stercoralis* infection 10 days after an exploratory laparotomy. The preoperative diagnosis was regional enteritis. The second patient had a history extending over 2½ years of recurrent monilial infection of the nose and mouth. The terminal event was a *Cryptococcus* pneumonia. Although larvae and adult forms of *Strongyloides stercoralis* were found in six stool and three sputum examinations the role of the parasite was not appreciated until autopsy had been performed.

The mechanism of death in both patients was starvation associated with extensive destruction of the mucosa of the proximal small intestine. Obstruction and disturbance of normal peristalsis were additional important factors in producing this state of slow starvation. In the first case there was infection of the pancreatic duct although it was not obstructed and the pancreas was not otherwise damaged. In neither was there clinical evidence of impaired fat absorption.

It is difficult at first sight to reconcile the extensive change in the intestinal tract with the vicarious presence of this well-known parasite. The pathological changes in the first case were of great severity. The abdominal cavity revealed acute peritonitis; there were marked thickening and petechiae of the mesentery and the lymph nodes were hyperplastic. There were also severe changes in the stomach, and the submucosa of the pylorus and antrum was oedematous. The mucosa of the duodenum and proximal half of the jejunum showed marked thickening which caused narrowing of the intestinal tract and there were numerous shallow ulcerations.

Microscopic examination of the distal stomach showed many rhabditoid larvae of *S. stercoralis* in the mucosa, and wet preparations of the mucus in the duodenum showed numerous adult females and rhabditoid larvae. The markedly

thickened mesentery also showed *Strongyloides* larvae in thin-walled channels and in the periphery of lymph nodes. The larvae were also found in some of the pancreatic ducts. In the second patient, adults, larvae and eggs of *Strongyloides* were also found in the gastric mucosa and adults and larvae were found in the mucosa of the jejunum. Extensive ulceration was found in these organs. [From the evidence presented in this paper it is difficult to decide whether the large numbers of *Strongyloides* were the cause of the changes or secondary to them.] *Philip Manson-Bahr*

STOTT, G. J. & JOPLING, W. H. **Dithiazanine in Strongyloidiasis and Trichuriasis.** *J. Trop. Med. & Hyg.* 1961, Mar., v. 64, No. 3, 73–4.

In this short note the authors, from the Hospital for Tropical Diseases, London, refer briefly to the literature on dithiazanine and describe its use in patients with strongyloidiasis and trichuriasis. Adults received 200 mgm. thrice daily and the 4 small children in the series 200–300 mgm. daily in 3 divided doses; the dose for children amounted to about 20 mgm./kgm. which is less than the 20 mgm./lb. recommended by SWARTZWELDER *et al.* [this *Bulletin*, 1958, v. 55, 530]. Stools were examined for *Strongyloides* larvae and *Trichuris* ova by the formol-ether concentration method [*ibid.*, 1956, v. 53, 1188].

12 patients with strongyloidiasis were treated for 7–14 days, and 11 were cured; the percentage of positive stools fell from 87 to 3. 26 patients were treated for 21 days and 25 were cured: the percentage of positive stools fell from 78 to 3. Evidently there was no significant difference between the two schedules.

50 patients with trichuriasis were treated for 5–10 days and 23 were cured: the percentage of positive stools fell from 96 to 45. 11 were treated for 21 days and 10 were cured: the percentage of positive stools fell from 100 to 5.

It would seem that 14 days' treatment was sufficient to cure "over 90% of cases of strongyloidiasis", but 21 days' treatment was required to obtain comparable results in trichuriasis.

[The common practice of quoting percentages of small numbers, such as 26 and 11, is to be deprecated.] *H. J. O'D. Burke-Gaffney*

CARBONELL, L. M. & APITZ C., R. **Sulfhydryl and Disulfide Groups in the Cuticle of** *Ascaris lumbricoides* **var.** *suis*. *Exper. Parasit.* New York. 1960, Dec., v. 10, No. 3, 263–7, 8 figs.

KENT, H. N. **Isolation of Specific Antigens from** *Ascaris lumbricoides* **(var.** *suum***).** *Exper. Parasit.* New York. 1960, Dec., v. 10, No. 3, 313–23, 9 figs. [31 refs.]

"Fresh *Ascaris lumbricoides* var *suum*, females, were extracted with triple distilled water at 4°C. after previous homogenization and delipidation with absolute ethanol and ether at −70°C. as described elsewhere. The water extract analysed by paper and agar-gel electrophoresis showed six distinct groups of protein which were separated and isolated by column chromotography with DEAE cellulose, and by preparative agar-gel electrophoresis. The chemical composition of these fractions as well as their antigenic potential was studied."

Most of the water soluble proteins extracted appeared to be glycoprotein complexes with considerable antigenicity. The qualitative chromatographic analyses of the hydrolysed protein moieties indicated significant differences in their amino-acid composition and in variable amounts of bound carbohydrate. Each of these antigens could therefore be expected to have different immunological activity. Antigenicity is probably related to the glycoprotein complex structure. Two fractions were capable of stimulating the production of sensitizing and precipitating antibodies. These antigens reacted against sera obtained from suspected cases of visceral larva migrans. These two fractions had a high content of bound carbohydrate which is probably responsible for the specific immunological character. *W. E. Kershaw*

BIAGI F., F., PATÁN, Ana M., CUENCA, Graciela & HERNÁNDEZ-CHIÑAS, J. C. **Value of a Skin Test and Precipitin Reaction in Diagnosis of Ascariasis.** *J. Infect. Dis.* 1960, Sept.–Oct., v. 107, No. 2, 149–54. [11 refs.]

Antigens were made by different methods [for the details see original] from *Ascaris lumbricoides*, *Taenia solium*, *T. saginata*, *Necator americanus*, *Enterobius vermicularis* and *Trichuris trichiura*, *A. lumbricoides suum*, *Fasciola hepatica* and *Cysticercus cellulosae*, *T. pisiformis*, *Dipylidium caninum*, *Ancylostoma caninum*, *Spirocerca lupi* and *Toxocara canis*. Intradermal tests and precipitin reaction were done in man, in subjects with and without ascariasis, with antigen made from *A. lumbricoides*, and a precipitin reaction was also done in animals sensitized by infection with *A. lumbricoides* embryonated eggs or by the injection of extracts of this parasite.

The skin test was positive in nearly all the subjects with ascariasis and in those who had a past history of being parasitized. It was negative in people who had never suffered from ascariasis.

The precipitin reaction was nearly always positive with serum from those with ascariasis, and usually negative in those previously infected. Precipitins to antigen made from *A. lumbricoides* were found in animals infected with *Ascaris* larvae or injected with extracts. There was no cross-reaction with antigen made from *Toxocara canis*, but cross-reactions occurred with antigens made from *A. lumbricoides suum*, *F. hepatica*, *E. vermicularis* and *T. trichiura*.

W. E. Kershaw

SAID, M. K. & SAAD-EL-DIN EL-DARS, M. **Intestinal Obstruction due to *Ascaris*. Report of 4 Cases and Review of the Literature.** *J. Egyptian Med. Ass.* 1960, v. 43, No. 12, 970–74.

JOSHI, B. N., NAIR, B. & GADGIL, R. K. **Round Worm induced Abscess of the Liver with Secondary Pericarditis.** *J. of J. J. Group Hosps. & Grant Med. College.* Bombay. 1961, Jan., v. 6, No. 1, 63–4.

" 1. A case of heavy infestation with ascaris with ectopic migration resulting in multiple cholangitic abscesses, lung abscess and purulent pericarditis in a child aged 2½ years is reported.

"2. The interest in the case lies in the complete absence of any symptoms in spite of all these lesions."

YUCEL, A. & DESCHIENS, R. Dépistage d'un foyer de filariose à *Wuchereria bancrofti* en Turquie Orientale. [**Recognition of a Focus of** *Wuchereria bancrofti* **Infection in Eastern Turkey**] *Bull. Soc. Path. Exot.* 1960, Sept.–Oct., v. 53, No. 5, 885–91, 5 figs. on 2 pls. & 1 map.

The existence of a focus of *Wuchereria bancrofti* filariasis in eastern Turkey, north of 38° latitude, is interesting from the epidemiological viewpoint and it shows, too, that in addition to sporadic cases to the north of the Mediterranean basin, the local prevailing conditions favour the development of this infection. The establishment of these foci in Turkey does not appear to be of recent origin, because the peasants of d'Elâzig still employ the traditional empirical treatment for the extraction of the filariae from the lesions.

Comparison of the conditions necessary for the establishment of these indigenous foci in Turkey and in Israel is interesting inasmuch as the indigenous foci in the latter country are more southerly (30°–36°N), so it seems that the local climatic conditions are comparable to those of the mountainous regions of d'Elâzig. *Culex molestus*, the probable vector, abounds. In eastern Turkey the disease has long been established, while that in Israel has been, in recent years, augmented by immigration of microfilaria carriers from Malabar in India [this *Bulletin*, 1961, v. 58, 716].

The existence of autochthonous cases of *W. bancrofti* infection in the Mediterranean basin was first noted by LACAVA in the Province of Treviso in 1916 and the second, also in Italy, in 1929. CASTELLANI described 2 cases in Yugoslavia in 1917 [*ibid.*, 1918, v. 11, 212]. In Hungary in 1929 NEUBER [*ibid.*, 1929, v. 26, 985] identified an aboriginal case. BRUMPT [*ibid.*, 1950, v. 47, 573] recorded a case at Canet-de-Mar near Barcelona.

D'Elâzig is at an altitude of 980–1,150 metres, about 300 kilometres from the seaboard. There the cases are comparatively numerous and appear to be grouped in a limited territory. The evolution has been slow, from 10–20 years. Four typical instances are cited and of these the first is the most instructive.

The first, in a woman of 26 who had been ill for 15 years, was identified in 1960. She presented with lymphatic varices of the lower limbs, especially the left leg; above the internal malleolus an indurated painful swelling was observed, from which two adult worms were extracted by biopsy. Microfilariae of *W. bancrofti* were present in the bloodstream. Her condition was much improved by diethylcarbamazine treatment. Of the remaining 3 cases, 2 were in women. The man, aged 47, had been afflicted for 30 years. In all these cases, the filarial complement fixation was positive. 5 other comparable cases have been seen.

The technique of surgical extraction of the adult worms is efficiently practised in Turkey. The subdermal scars are frequently seen and are evidence of this practice which is usually followed by subsidence of local symptoms. Moreover, Turkish peasants have devised a method without surgery for exterminating these worms from the lesions they produce by employing a singularly original technique. They apply in the region of the presumed filarial lesion a fragment of the stomach of a recently killed fox and this is covered with a tight bandage of lint or gauze. After 24 hours they search along the outer edge of this viscus

for the filariae which have emigrated across the skin and the stomach up to the bandage.

This method can be very efficacious and Yucel verified the results himself and confirmed that in some cases the filariae crossed the skin and were recovered in the dressings. *Philip Manson-Bahr*

WU, Yao-Tsing. **[Studies in Filariasis in Taiwan]** *Igaku Kenkyu*. Fukuoka. 1961, Jan., v. 31, No. 1, 209–28, 5 figs. [69 refs.] [In Japanese.] English summary.

This abstract is based on the author's summary in English and on the information provided in the tables, which are also in English. The paper reviews various studies on filariasis in Taiwan and the Pescadores, carried out from 1958 to 1960.

It is thought that filariasis due to *Wuchereria bancrofti* was brought from South China, where it is endemic, *via* the offshore islands and the Pescadores to south-west Taiwan. A microfilaria rate of 19·11% has been recorded by surveys in Kinmen (Quemoy) [this *Bulletin*, 1957, v. 54, 66]; microfilaria rates found during the present study were 8·43% in the Pescadores and 2·81% in south-west Taiwan.

Culex pipiens fatigans was the most common mosquito in human dwellings in the Pescadores, with numerous suitable breeding places around the houses; natural filarial infections in this species could be found throughout the year. Artificial feeding experiments confirmed its efficiency as a vector of local *W. bancrofti,* and 37 (84%) of 44 specimens kept for more than 10 days after feeding contained infective larvae.

Trials of various control measures were carried out in the Pescadores. The best results were obtained from mass treatment with diethylcarbamazine in doses of 6 mgm. per kgm. body weight once a month for 12 months for every one, with microfilaria carriers receiving an additional course of 6 mgm./kgm. once a day for 10 days; this last treatment was repeated in the second year. The drug treatment of microfilaria carriers only, plus house-spraying with residual insecticide, was slower to take effect. The residual action of a mixture of DDT at 500 mgm. and gamma BHC at 200 mgm. per square metre lasted for less than a month, judged by biological tests, and *C. p. fatigans* in the sprayed area apparently developed a 16-fold resistance to BHC. [Table 11 shows a difference in susceptibility to BHC between mosquitoes from the unsprayed and from the sprayed areas, as measured some 9 months after a single application of the residual insecticide, but there is no record of a similar test made before spraying started. Table 12 as printed shows complete insusceptibility to DDT by mosquitoes from both areas, but the author does not comment on this in his summary.]

Other experiments with drug treatment indicated that the results were better in microfilaria carriers with a density of less than 20 per 20 cmm. of peripheral blood than in those with higher density, and that there was no significant difference in the results of treatment with 6 mgm./kgm. of diethylcarbamazine daily for 7 days, 10 days or 14 days.

The incidence of filariasis among the military, and among evacuees from the Ta-Chen islands [*ibid*., 1956, v. 53, 631; 1961, v. 58, 718] has declined steadily since 1950, and there is no evidence of the spread of *Wuchereria* [*Brugia*] *malayi* infections from imported cases to the people of Taiwan. *T. Wilson*

BATISTA, D., CERQUEIRA, N. L. & MORAES, M. A. P. Epidemiologia de mansonelose em localidade do interior do Amazonas. [**Epidemiology of Mansonellosis in the Interior of Amazonia**] *Rev. Assoc. Med. Brasileira.* 1960, June, v. 6, No. 3, 176–84, 2 figs. [25 refs.] English summary.

The authors first mention that in Latin America mansonellosis has been reported from Mexico to Northern Argentina, but state that so far in Brazil the only known foci are in the State of Amazonas to the north and west of and not far from the city of Manaus [this *Bulletin*, 1958, v. 55, 1259]. Two expeditions were sent by the National Institute for Research in Amazonia in April and May 1958 to the town of Codajás where the incidence of microfilaraemia had already been found to be high, the object being to study the epidemiology of the disease, especially as regards possible reservoirs and vectors.

Over 1,000 persons in the town and in two neighbouring areas had their bloods examined [see abstracter's note below].

The investigations showed that workers in agriculture, forestry and in the extractive industries were by far the most frequently attacked, though almost one-third had been infected by the 10th year of age. In general, white agriculturalists were more often attacked than non-whites.

Examination of domestic blood-sucking insects was negative. However, a sylvan simuliid was found naturally infected and it was shown that the complete cycle from ingestion of blood to infective larvae in the proboscis could occur in *Simulium amazonicum* in about 9 days. It thus becomes a new vector. In addition the tabanid *Lepiselaga crassipes* was also found naturally infected and its role as a possible vector remains to be cleared up.

During the investigations 81 specimens of mammal were killed, belonging to 17 species, and 35 specimens from 21 species of bird. 56 specimens of 13 species of mammal and 6 specimens of 5 species of bird were found to have microfilariae in their blood but none resembled *Mansonella ozzardi*. Dogs showed only *Dirofilaria immitis*.

The authors therefore concluded that man is the reservoir and that *S. amazonicum* is the vector. They admit however that in view of the wide distribution of this insect it is not clear why mansonellosis appears to be limited to the area indicated, so that further studies are essential to determine this. *Culicoides paraensis* may also be a vector and the natural infection of *Lepiselaga crassipes* remains to be explained.

It follows therefore that mansonellosis constitues a very real public health problem.

[It is not clear whether the figures relating to blood examinations are those reported already by Batista *et al.* (see *ibid.*, 1961, v. 58, 723) but they seem to be identical. In any case the authors are to be congratulated on a most interesting investigation. It is to be hoped that a further report on subsequent investigations will be made available.] *W. K. Dunscombe*

DASHIELL, G. F. **A Case of Dirofilariasis involving the Lung.** *Amer. J. Trop. Med. & Hyg.* 1961, Jan., v. 10, No. 1, 37–8, 2 figs.

Although worms of the genus *Dirofilaria* are known to infect man [this *Bulletin*, 1960, v. 57, 933, 1293] there does not appear to be a record of lung involvement.

The author, from Detroit, Michigan, reports the case of a white woman aged 57, who was found by X-ray examination in December 1959 to show a nodular density of 1 cm. diameter in the anterior segment of the right upper lobe of the lung. During the previous 14 months she had developed hypertension and mild cardiac decompensation which had responded to treatment: X-ray findings at the beginning of that period had been normal. As malignancy was suspected, the area was resected and in six preparations transverse and longitudinal sections of a single dead worm were found in a necrotic pulmonary artery: the average diameter of transverse sections was about 200μ. Full detailed descriptions are given and the appearances are illustrated in 2 photomicrographs. The worm was identified by Professor Paul BEAVER as a *Dirofilaria*. The size, absence of ridges on the cuticle and the location suggested that it was possibly *D. immitis*.

The patient had lived in Detroit for 20 years, but had visited South Carolina 12 times in the last 8 years, one visit being in May 1959. She did not recall having had fever or skin or eye lesions thereafter.

A concentrated blood sample, blood films taken in the day and night over a period of 4 days, serological tests and stool and urine examinations were all negative. The possible causal association of the dead worm in the lung with the patient's cardiac symptoms is considered. *H. J. O'D Burke-Gaffney*

PRICE, D. L. **The Occurrence of *Loa loa* in Uganda.** [Correspondence.] *Trans. Roy. Soc. Trop. Med. & Hyg.* 1961, Mar., v. 55, No. 2, 199.

The literature does not suggest that *Loa loa* is endemic in Uganda. The author arrived in Makerere College Medical School, Kampala, in July 1960 and has already seen 2 cases of this infection at autopsy and 7 in 100 persons examined in the Toro district. As the 2 cases seen at autopsy had originated from the Lengo and Mengo districts, it would seem that *L. loa* is not only endemic but possibly widespread. [No details of identification are given.]

H. J. O'D. Burke-Gaffney

See also p. 862, HYNES, **A Plea for Caution in the Use of DDT in the Control of Aquatic Insects in Africa.**

FAN, P. C., HSU, J. & LIU, J. C. **Studies on Oxyuriasis. IV. Epidemiology of Oxyuriasis in Free China.** Reprinted from *Chinese Med. J.* Taipei. 1960, June, v. 7, No. 2, 111–28, 1 map. & 7 figs. on 2 pls. [36 refs.]

Surveys for enterobiasis were carried out on 3,178 children in 5 primary schools and 3 villages in the islands of Taiwan, Kinmen and Matsu off the south-west coast of China, during the period 1957–1960.

The overall infection rate was 50·88%. The highest rates were found in the north of Taiwan, where the climate is colder than in the south. Higher rates were recorded in urban than in rural areas. They were higher in the age-group 7–13 years than at any other period. There was a direct relation between the infection rate and the number of children in each family.

The NDMC scotch tape swab technique [*Chinese Med. J.*, 1955, v. 2, 183; 1956, v. 3, 182; this *Bulletin*, 1957, v. 54, (1343)], in which the swab is wrapped

around the smooth end of a glass rod, was found the most efficacious for removal of ova from around the anus.

The results are set out in great detail in 13 tables and illustrated by 7 figures and a map. *G. Covell*

See also p. 820, STOTT & JOPLING, **Dithiazanine in Strongyloidiasis and Trichuriasis.**

OVSYUKOVA, N. I. [**A Case of Trichinellosis in a Squirrel on the Chukotka Peninsula**] *Med. Parasit. & Parasitic Dis.* Moscow. 1961, v. 30, No. 2, 226. [In Russian.]

ZAIMAN, H., HECHT, H. S. & HOWARD, R. G. **Mortality of Young Male Mice infected with 6,400 Normal or Irradiated** *Trichinella spiralis* **Larvae.** *Exper. Parasit.* New York. 1960, Dec., v. 10, No. 3, 284–6.

"Each of a total of 160 five-week-old male Swiss albino mice divided into four groups, was inoculated with 6,400 *Trichinella spiralis* larvae subjected to various doses of roentgen radiation and their survival times recorded.

"One hundred per cent of the mice died if the larvae received no irradiation. None died if the larvae received 12,000 r. Approximately 85% of the mice died if the larvae were irradiated with 8,000 or 10,000 r."

CHUTE, R. M. **Infections of** *Trichinella spiralis* **in Hibernating Hamsters.** *J. Parasitology.* 1961, Feb., v. 47, No. 1, 25–9. [13 refs.]

"1. Hibernation may either prevent or retard development of *T. spiralis* in the golden hamster.

"2. Forty-eight and 72 hours of hibernation at 5 C gave complete protection to four hamsters receiving 200 *T. spiralis* larvae when the onset of hibernation was within the first 36 hours.

"3. No larvae were recovered from six hamsters hibernating for periods of 19 to 39 days following infection with 200 *T. spiralis* larvae. The first observed hibernation in this group occurred from 1 to 20 days after infection."

BERNARD, G. R. **Experimental Trichinosis of the Golden Hamster. III. Urinary Changes with Observations upon the Urinary Uric Acid/Creatinine Ratio.** *J. Infect. Dis.* 1961, Jan.–Feb., v. 108, No. 1, 1–11, 7 figs. [Numerous refs.]

MATOFF, K. Weitere Untersuchungen über Muskeltrichinellose, erzeugt durch Aufnahme von Darmtrichinellen. [**Further Observations on** *Trichinella* **Invasion of Muscles Produced by Infection with Intestinal Forms**] *Ztschr. f. Parasitenk.* 1961, v. 20, No. 5, 470–76. [15 refs.]

Previous attempts in 1956 to infect rats, guineapigs and dogs by ingestion of female intestinal forms of *Trichinella* proved only partially successful. They

were slight infections which could be satisfactorily accounted for because only a small proportion of these nematodes swallowed are capable of passing unharmed through the stomach of the new host on their journey to the intestines.

In 5 out of 6 pigs and in all of 6 dogs which had ingested the intestines or their contents containing these particular forms of *Trichinella*, the discovery of larval stages in the muscles of choice was confirmed by employing the compression or the digestion technique for their demonstration. Muscle trichinellae were found in their favourite sites with great regularity, but widely distributed in other muscles as well.

Uually, invasion of muscle fibres was on a small scale and the highest number of muscle trichinellae found in the crura diaphragmatica was 15 in the pig and 13 in the dog by means of the compression method. These numbers increased when the digestion technique was used, varying from tens up to several hundreds (911 in a pig).

The mode of infection through the intake of gut trichinellae could assume a certain epizoological and epidemiological significance. The flesh infected in this manner can serve as infective material for other domestic animals, such as pigs, dogs, cats, as well as for "synanthropic" rodents. Pigs, for instance, in case of massive invasion by trichinellae, could eventually form a reservoir of infection for man. *Philip Manson-Bahr*

DEFICIENCY DISEASES

See also p. 866, Oomen, **The Papuan Child as a Survivor.**

Abdulnabi, M., Abutrab, Nasima, Dhia, Leila Y., Kamil, F., Shukri, S. & Yahya, A. S. **The Nutritional Values of Some Iraqi Foodstuffs.** *J. Facul. of Med., Baghdad.* 1961, Jan., v. 3 (n.s.), No. 1, 10–11.

Luyken, R. & Luyken-Koning, F. M. W. **The Digestibility of Boiled Ground Soybeans.** *Trop. & Geograph. Med.* Amsterdam. 1960, Dec., v. 12, No. 4, 359–62. [17 refs.]

As traditional methods of preparation of soybeans for human food to make them digestible are complicated and time-consuming, a simple method might be useful in parts of the world where soybeans could improve protein supply. The nitrogen and fat excretion, and content in food, were determined for each of 4 Javanese children in a Surinam hospital over a period varying from 6–16 days. In the middle of each period, a bread and butter breakfast was replaced by a porridge made of ground Surinam soybeans (45 gm.) boiled in water for 10 minutes. This soybean provided about one-third of the protein in the daily diet, the rest coming chiefly from bread and rice with a little from 10–15 gm. of fish.

The soybean porridge was well tolerated, though occasionally vomited when too concentrated. The percentage weights of consumed nitrogen excreted before

and after consumption of soya were 16 and 15, 17 and 19, 25 and 16, 22 and 26 respectively in the 4 children; parallel excretion percentages of consumed fat were 4 and 8, 6 and 7, 7 and 10 and 9 and 17. In 3 of the 4 children there was no decreased absorption of nitrogen or increased excretion of fat; in the fourth child nitrogen absorption decreased and fat excretion increased; thus, nitrogen and fat absorption was not, on the whole, unfavourably influenced. Similar observations have been made in Africa and the findings justify further research [this *Bulletin*, 1957, v. 54, 992; 1959, v. 56, 349]. *T. P. Eddy*

SCRIMSHAW, N. S., MÉNDEZ, J., FLORES, Marina, GUZMÁN, M. A. & DE LEÓN, R. **Diet and Serum Cholesterol Levels among the "Black Caribs" of Guatemala.** *Amer. J. Clin. Nutrition.* 1961, Mar.–Apr., v. 9, No. 2, 206–10. [22 refs.]

VINCENT, M. & ORY, J. Evaluation d'un indice nutritionnel. **[Evaluation of a Nutritional Index]** *Ann. Soc. Belge de Méd. Trop.* 1960, June 30, v. 40, No. 3, 561–8, 1 graph.

The authors have utilized the proportion of urinary urea nitrogen over urinary total nitrogen as a test of nutritional status. However, the great variability of this index led them to abandon this procedure. In particular they feel that they cannot rely on this index because no significant differences were seen when lactating mothers from a rural area of Kwango were compared with economically well-to-do persons such as well-nourished Europeans and local hospital employees of African origin. The lactating mothers would almost certainly have been in negative or near negative nitrogen balance. *H. Lehmann*

SRIKANTIA, S. G. & BELAVADY, B. **Clinical and Biochemical Observations in Phrynoderma.** *Indian J. Med. Res.* 1961, Jan., v. 49, No. 1, 109–14, 1 graph. [16 refs.]

Follicular keratosis of the skin, often known as phrynoderma or toad-skin, is common in malnourished people, particularly children. It was first thought to be a manifestation of vitamin A deficiency, but subsequently various investigations, in India and elsewhere, showed that its incidence could not be correlated with the vitamin A activity of diets, or with the ocular manifestations of vitamin A deficiency. GOPALAN [*Bull. Hyg.*, 1947, v. 22, 524] found that vitamin A concentrates had no effect on phrynoderma, but that it could be effectively treated by preparations rich in essential fatty acids.

The authors studied 63 patients with phrynoderma in the Nutrition Clinic and Nutrition Ward of the Osmania General Hospital in Hyderabad. The majority were between the ages of 3 and 15 years. Treatment with safflower oil, which is rich in linoleic acid, led to clinical improvement in most of the patients. The simultaneous administration of vitamins of the B complex hastened the disappearance of the condition and produced a response in all patients. The iodine value of serum fatty acids, low before treatment, increased after the safflower oil was given. An increase in red cell fragility was observed in untreated patients, but tended to disappear on treatment. *W. R. Aykroyd*

See also p. 848, FINDLAY, **Coenzymes I and II in the Human Epidermis. Changes in Nutritional Sun-Sensitivity (Pellagra) and during Cytostatic Drug Therapy.**

OYAKE, H., KUDO, Z. & ARAKAWA, T. **A Correlation between Nuclear Diameters of Oral Epithelial Squamous Cells and Blood Vitamin B_{12} Levels of Children with Nutritional Dystrophy. Studies on Nutrition of Children at Hirosaki Area (83rd Report).** *Tohoku J. Exper. Med.* 1960, Oct. 25, v. 72, No. 3, 243–8, 2 figs.

The authors refer to earlier work by GRAHAM and RHEAULT (*J. Lab. & Clin. Med.*, 1954, v. 43, 235) who claimed that in pernicious anaemia nuclei of squamous epithelial cells, gastric columnar cells and histiocytes showed characteristic changes in the size of the nucleus, multinucleation and a change of chromatin distribution. These nuclear and cellular changes were said to disappear rapidly after vitamin B12 therapy.

In view of this and later work by other authors the present study was undertaken in an attempt to examine the changes in the diameters of nuclei of squamous epithelial cells obtained from mouth-washings in malnourished children before and after therapy with vitamin B12 and folic acid. In 36 children the coefficient of serum vitamin B12 level and nuclear diameter of squamous cells showed a reverse correlation of $-0{\cdot}72$ when there was no additional folic acid deficiency. When there was folic acid deficiency the coefficient between vitamin B12 and nuclear diameter was $-0{\cdot}42$. Although these figures are not very striking they do suggest that in addition to vitamin B12 folic acid deficiency can cause the nuclear changes seen in malnutrition. *H. Lehmann*

SHAH, P. M. **Blood Volume Studies in Edematous Children. I. Normal Children.** *Indian J. Med. Sci.* 1961, Feb., v. 15, No. 2, 109–16, 3 figs. [10 refs.] **II. Renal Edema.** *Ibid.*, 117–23, 1 fig. & 2 diagrams. [16 refs.] **III. Cardiac Edema.** *Ibid.*, 124–8, 1 fig. & 1 diagram. [12 refs.]

KAUL, K. K. **Serum Ionogram in Third Degree Malnutrition. I. Oedematous Malnutrition.** *Indian J. Pediatrics.* 1960, Jan., v. 27, No. 144, 1–8. [24 refs.] **II. Marasmic Malnutrition.** *Ibid.*, 9–14. [14 refs.]

These two papers report the results of serum electrolyte studies on 22 children suffering from severe malnutrition with oedema, 28 children with severe marasmic malnutrition and 20 normal healthy children. Serum sodium, potassium, calcium, chloride and bicarbonate were estimated.

The children with nutritional oedema showed significantly low potassium values, the values for the other electrolytes being within normal limits. The marasmic children showed normal potassium values and although values for the other electrolytes were in some cases near the limits of normality, none was significantly outside the normal range.

Treatment of both groups of malnourished children resulted in the electrolyte values approaching closer to those of the control group. *W. P. Stamm*

SLONE, D., TAITZ, L. S. & GILCHRIST, G. S. **Aspects of Carbohydrate Metabolism in Kwashiorkor with special reference to Spontaneous Hypoglycaemia.** *Brit. Med. J.* 1961, Jan. 7, 32–4, 3 figs.

Hypoglycaemia is an important cause of death in severe kwashiorkor. Of the many factors which might be responsible for depletion of liver glycogen, hormonal agents must be considered as well as mere intestinal malabsorption.

In 9 patients the intravenous glucose tolerance test was carried out and the results were compared with those seen in well-nourished children of the same age-group. In addition, the fasting blood sugar was determined in 18 patients and compared with normal controls. The difference between the mean values of the two groups was highly significant—50 mgm. per 100 ml. in the kwashiorkor group and 76 mgm. per 100 ml. in the control group. The intravenous glucose tolerance tests showed the presence of a mild glucose intolerance which might be related to an impaired glucose uptake by the liver, or the peripheral tissues. The low fasting blood sugar in kwashiorkor is of practical importance and feeding schedules should be adjusted to avoid fasts of more than 4 hours.

H. Lehmann

EDOZIEN, J. C. **Enzymes in Serum in Kwashiorkor.** *Pediatrics.* Springfield, Ill. 1961, Feb., v. 27, No. 2, 325–33, 4 figs. [41 refs.]

This paper from Ibadan, Nigeria, records the results of liver function tests and numerous serum enzyme estimations obtained in 50 new untreated kwashiorkor patients, aged 1–5½ years and in 450 apparently healthy Nigerian children of the same age-group. It also gives results obtained in 350 healthy adult volunteers and blood donors.

The activity of amylase, alkaline phosphatase and pseudocholinesterase was very much lowered in kwashiorkor. On the other hand, glutamic oxalacetic transaminase, glutamic pyruvic transaminase and iso-citric dehydrogenase activity was increased in approximately 50% of the children with kwashiorkor. The author considers that the higher enzyme levels are derived from muscle rather than from liver. The reason for this belief is that total muscle mass is considerably greater than liver mass and therefore the total loss from muscle must be much greater than the total loss from liver. Furthermore iso-citric dehydrogenase, unlike the two transaminases, is predominantly a liver rather than a muscle enzyme and this enzyme was relatively less raised in the affected patients than the two transaminases. The enzyme changes in 3 of the patients with kwashiorkor followed the patterns found in acute hepatic disease. This type of case would be expected to progress to liver cirrhosis should the patient survive. [See also this *Bulletin*, 1960, v. 57, 1094.] *H. Lehmann*

METCOFF, J., FRENK, S., ANTONOWICZ, Irena, GORDILLO, G. & LOPEZ, Elizabeth. **Relations of Intracellular Ions to Metabolite Sequences in Muscle in Kwashiorkor. A New Reference for assessing the Significance of Intracellular Concentrations of Ions.** *Pediatrics.* Springfield, Ill. 1960, Dec., v. 26, No. 6, 960–72, 6 figs. [32 refs.]

8 children with severe kwashiorkor were examined in Mexico during the summer of 1958—3 died subsequently. Muscle biopsies were obtained on

admission and later on and were analysed for electrolyte content and intermediates of carbohydrate metabolism—alpha-ketoglutarate, citrate, pyruvate and lactate. Preliminary data were also obtained on concentrations in the muscle cell of phosphoenolpyruvate, isocitrate, oxalacetate and pyruvic kinase.

The authors came to the conclusion that death from kwashiorkor was associated with a marked reversal in the sodium: pyruvate ratio and also with a reversal of the inorganic—organic phosphate: pyruvate ratio. This is interpreted as being the outcome of a defect in the formation of pyruvate from phosphoenolpyruvate. This process depends on potassium, magnesium and phosphorus. In the children who died a reversal was also seen of the citrate—magnesium—inorganic phosphate: alpha-ketoglutarate ratio.

It is suggested that the cellular swelling of muscle which is so characteristic of kwashiorkor reduces the concentration of essential intracellular ions and therefore inhibits steps of the energy metabolism in which an optimal concentration of these ions is required. *H. Lehmann*

WALT, F., TAYLOR, Jean D. & ROBERTSON, L. **The Anaemias in Kwashiorkor.** *Med. Proc.* Johannesburg. 1961, Feb. 11, v. 7, No. 3, 47–50. [12 refs.]

As a part of a general investigation into the treatment of kwashiorkor carried out in Durban since 1957 the authors studied the anaemias occurring in the disease and their treatment [this *Bulletin*, 1959, v. 56, 1178].

93 patients with kwashiorkor were admitted and 86 studied by complete blood counts and bone marrow examination on admission and on the 28th day and in some on the 42nd day as well. Haemoglobin was estimated 3 times a week with a Spencer haemoglobinometer and an oxyhaemoglobin method. In some of the later cases serum iron and total iron binding capacity were estimated.

The commonest form of anaemia was normocytic normochromic, less frequently megaloblastic; iron deficiency seldom presented as a primary type but occurred more often during the course of treatment particularly of megaloblastic anaemia.

There were 63 patients of the normocytic type with a normal bone marrow. Their mean haemoglobin was 10·1 gm.% on admission, falling to 8·9 gm.% after 28 days. In 20 patients followed for 42 days the mean haemoglobin rose again to 10·4 gm.%. There were 22 patients with a megaloblastic bone marrow. Their mean haemoglobin was 9·3 gm.%. 3 of these died and the remainder were treated with folic acid 7·5 mgm. intramuscularly daily for 3 days followed by 15 mgm. orally daily for 25 days in addition to the standard treatment for the protein deficiency. The mean haemoglobin of these at 28 days was only 8·3 gm.% and in 13 observed after 42 days was still only 8·8 gm.%. There were 5 patients with a hypoplastic bone marrow. Their mean haemoglobin level rose from 9·5 gm.% on entry to 10 gm.% after 28 days. Acute episodes of erythroblastopenia occurred in 2 patients, associated with infection. There was some evidence of iron deficiency developing during treatment, but an attempt to treat alternate patients with Imferon did not give a statistically significant improvement.

The authors conclude that folic acid is of value for all cases of kwashiorkor,

and that iron, preferably parenteral, is also needed. In spite of treatment response is slow, and an improvement exceeding 10 gm.% haemoglobin needs 6 weeks or more. *A. C. E. Cole*

SPRUE

HOLMES, R., HOURIHANE, D. O'B. & BOOTH, C. C. **Dissecting-Microscope Appearances of Jejunal Biopsy Specimens from Patients with "Idiopathic Steatorrhoea".** *Lancet*. 1961, Jan. 14, 81–3, 5 figs.

Jejunal biopsies taken in the usual way from patients with idiopathic steatorrhoea have revealed two main patterns. The most striking feature in some cases is a flat thick mucosa devoid of normal villi. This appearance has been called subtotal villous atrophy. In other patients the glandular layers are thickened, as in subtotal atrophy, but the mucosa shows short, broad and thickened villi (partial villous atrophy). The possibility has been suggested that these differing histological appearances represent at least two causally distinct disorders.

The authors decided to examine their biopsy specimens under the dissecting microscope which they consider reveals the nature of the pathological changes more clearly than do the conventional histological techniques. The samples were laid out on white filter paper, fixed in 15% formol saline and then examined under a dissecting microscope. Histological sections were subsequently prepared. 30 patients suffering from idiopathic steatorrhoea were examined. All had evidence of intestinal malabsorption without hepatic or pancreatic disease and radiography revealed no new growths or anatomical lesions. In 16 patients there was subtotal villous atrophy with absent villi and completely flat surface. In 11 there was partial villous atrophy in which there were no true villi, but the surface was not flat but thrown up into a series of convolutions and whorls giving the appearance of villi. Histological section showed these "villi" to be in fact transverse sections through the ridged mucosa. In 3 patients the mucosa was normal. *B. G. Maegraith*

GIRDWOOD, R. H., DELAMORE, I. W. & WILLIAMS, A. W. **Jejunal Biopsy in Malabsorptive Disorders of the Adult.** *Brit. Med. J.* 1961, Feb. 4, 319–23, 3 figs. [20 refs.]

Jejunal biopsies were carried out by the peroral method in 24 patients with malabsorptive disease of the idiopathic steatorrhoea type and in 18 other patients, 6 of whom had steatorrhoea from other causes. 3 of the 24 had been treated with a gluten-free diet for more than 6 months and 11 had had folic acid over a similar period. One patient was later found to have anaplastic carcinoma of the jejunum. In others, steatorrhoea had followed after partial gastrectomy, gastroenterostomy, regional enteritis, resection of part of the ileum, and in unrecorded circumstances in 12 others. In all of these 18 patients, jejunal biopsies

showed normal mucosal appearance. Concentration of serum vitamin B12 was measured and tests were carried out of absorption and excretion of folic acid. Faecal excretion of fat was measured over a period of 5 to 18 days with a minimum of 7 consecutive stools. Glucose tolerance and xylose excretion tests were also made.

Three kinds of mucosal patterns were noted. (1) *Flat mucosal surface* with no normal villi, the surface completely or almost completely flattened and the epithelium grossly abnormal; frequent goblet cells with mild, moderate or heavy cellular infiltration of the lamina propria. 9 cases were in this group. (2) *Abnormal villi*: the mucosa was usually of abnormal or reduced width; villi were abnormal in size and shape and were short, broad and squat; changes in the epithelium were less marked; goblet cells were often numerous and there was mild to heavy cellular infiltration of the lamina. This pattern was seen in 10 cases. (3) *Normal mucosa*: 5 of the 24 and 6 of the 18 cases were in this category.

Thus, of the patients with primary malabsorption disease, 9 showed the flat mucosa with absent villi, 10 had abnormal villi and 5 normal villi. There was no obvious correlation between the type of mucosal appearance and either the presenting symptoms or the results of laboratory tests of absorption. There was nothing in these results to justify the view that primary malabsorptive disease with absent villi had a different aetiology or symptomatology from the primary malabsorptive disease with abnormal villi. [See also this *Bulletin*, 1961, v. 58, 245.] *B. G. Maegraith*

PARKINS, R. A. **Protein-Losing Enteropathy in the Sprue Syndrome.** *Lancet*. 1960, Dec. 24, 1366–9, 2 figs. [16 refs.]

The hypoproteinaemia and muscle wasting so common in sprue have been attributed to protein malabsorption but leakage of protein into the gastro-intestinal tract—"exudative enteropathy" or "protein-losing enteropathy"—provide an alternative explanation. Such protein loss has been demonstrated in hypertrophic gastritis, Crohn's disease, ulcerative colitis and other gastrointestinal diseases, and the demonstration of atrophic changes in mucosa of the small intestine of patients with sprue provides a possible organic basis for such protein loss in it also. A recently introduced technique for measuring intestinal permeability was used; a polyvinylpyrrolidone with a molecular weight approximately that of albumin and which when labelled with radio-iodine resisted the action of digestive juices, was injected intravenously and the radio-activity of the faeces subsequently assessed.

11 patients were studied, 2 of whom had developed symptoms for the first time while in the tropics. The diagnosis was established by the history, the finding of a faecal fat excretion in excess of 6 gm. daily, impaired glucose absorption and radiological abnormality of the mucosal pattern of the small intestine. Jejunal biopsies in each patient showed atrophic changes in the mucosa. Albumin labelled with radio-iodine was used to assess the deficiency of absorption of ingested protein and 3 patients appeared to have impaired absorption. 4 of the 11 patients excreted more polyvinylpyrrolidone labelled with radio-iodine than normal. The faecal excretion of this tracer could not be related to the clinical severity of the disease nor to the weight loss and there

was no relationship between its excretion and the level of the serum-albumin, the total serum proteins, faecal fat excretion or the absorption of radioactively labelled albumin. There was also a lack of correlation between the appearances of the jejunal mucosa at biopsy and the losses of radioactively labelled polyvinylpyrrolidone, thus suggesting that histological changes reported in sprue are not responsible for increased intestinal permeability. It appears that the factor responsible for the increased permeability and malabsorption in sprue is not the histologically visible lesion but is possibly an enzymal defect of the mucosal cell. The study showed that protein-losing enteropathy occurs in some patients with sprue and is independent of protein absorption, suggesting that the protein disturbances of sprue are complex and not solely attributable to protein malabsorption, to increased intestinal permeability or even to a combination of these. *A. W. Woodruff*

MOESCHLIN, S. & MEYER, P. G. Behandlung der idiopathischen Sprue (4 Fälle) durch parenterale Corticosteroidtherapie (Prednisolon, Dexamethason). [**Treatment of Idiopathic Steatorrhoea with Parenteral Corticosteroid Therapy**] *Schweiz. med. Woch.* 1961, Mar. 18, v. 91, No. 11, 320–26, 3 figs. [Numerous refs.]

This paper contains a very exact and meticulous study of 4 cases of idiopathic steatorrhoea. 2 of the patients were old people of 71 and 83 years. The outcome of these careful investigations is to lay special stress on the parenteral application of corticosteroids. In the second of the series (a woman of 71) a remission was obtained by daily intravenous injections of up to 75 mgm. of prednisolone succinate and in 2 others by intramuscular injection of dexamethasone (Millicorten), 15 mgm.

The results are particularly remarkable in view of the fact that in one case the usual therapeutic measures (diet, blood transfusions, vitamin B12, etc.) had been undertaken without success. The control period was 3 years (first case), 1½ years (second and third cases) and 6 months (4th case) after the cessation of treatment. At the end of that time only a slight shift to the left of the erythropoiesis in the bone marrow smears was seen.

Oral treatment with corticosteroids is insufficient for serious cases, because of the inhibited absorption of the drug by the intestinal tract. This partially explains the contradictory results so far reported in the literature with steroids.

It was interesting to observe that, even without the administration of vitamin B12 and folic acid, the concomitant pernicious anaemia disappears with parenteral corticosteroid therapy and shows a reticulocyte crisis 8–13 days after the therapy is begun. Parenteral corticosteroid therapy is considered, from these observations, to be the present therapy of choice. It should be combined with a diet poor in fat but rich in proteins. In serious cases it is necessary to give blood transfusions, to regulate the electrolytes, and give vitamins A, D and K.

Philip Manson-Bahr

HAEMATOLOGY

HIRSCH, H. **A Review of Blood Diseases in the African.** *Central African J. of Med.* 1961, Jan., v. 7, No. 1, 7–10.

In 1955, the author, from Johannesburg, but now writing from Durban, reviewed the blood dyscrasias seen in non-Europeans in South Africa [this *Bulletin*, 1956, v. 53, 646].

This paper is intended to bring the review up to date and incorporates further study of relevant material. It covers the same range of diseases and enlarges its comments. In general the conclusions correspond with those of the original survey, but unlike it, no figures of incidence are given. Only one new reference to other authors' work is listed [it is incorrectly cited].

H. J. O'D Burke-Gaffney

STOTT, G. **Anaemia in Mauritius.** *Bull. World Health Organization.* Geneva. 1960, v. 23, No. 6, 781–91.

In 1947 it was held that the very prevalent anaemia in Mauritius was caused by malnutrition and malaria. Malaria eradication was virtually complete in 1952, but the anaemia remained. In 1955 Professor A. W. WOODRUFF reported to the WHO that the anaemia was mainly hypochromic, and probably due to hookworm disease. The author then began the investigation now recorded.

Surveys established the great prevalence of severe anaemia at all ages, especially in the wetter regions of the island; and more detailed examination of 297 patients established that it was indeed a microcytic hypochromic anaemia (6·9% of 130 marrow examinations revealed megaloblastic changes, but it is pointed out that such patients feel much more ill than those with a similar Hb level due to iron deficiency, and were therefore preferentially selected).

Patients responded quickly to iron therapy, and not at all to folic acid (10 mgm./day) or vermifuges. Similarly, less anaemic subjects were found to improve on iron alone, and no greater improvement was obtained when skim milk, folic acid, or vermifuges were added. The dietary intake of a large section of the population was estimated to be about 6·3 mgm. Fe per day. For long-term prophylaxis it was thought likely that iron added to the food might be effective, and experiments were made on two groups (1) by giving children cachets supplying 6·6 mgm. Fe per day, (2) by enriching the food of adult males with 10 mgm. Fe per day. After 3 to 4 months there was a significant rise in the Hb level of both groups.

The relation of hookworm disease to the island's anaemia problem has been discussed [this *Bulletin*, 1961, v. 58, 712]. Although he recommends anthelmintic treatment for anaemic patients, the author feels that the most practical solution is to seek means of enriching the commoner foods with about 10 mgm. Fe per day, and to give extra iron to pregnant and lactating women.

Alan B. Raper

LEE, T. S. & WADSWORTH, G. R. **Assessment of Anaemia in Clinical Practice.** *Clin. Sci.* 1961, Apr., v. 20, No. 2, 205–16, 6 figs. [Numerous refs.]

This study was made on 45 healthy adults and 41 anaemic patients in Singapore, because it is well known that the concentration of haemoglobin in the peripheral blood does not necessarily reflect Hb excess or deficit in the whole

body, and it was desirable to know how accurately the latter could be assessed from simple clinical measurements.

The technical methods and detailed results must be consulted in the original paper, but the following conclusions are of importance for tropical practitioners. When a person enters a hot climate, the plasma volume rises, and thus the Hb and haematocrit fall; but this is soon corrected by a mechanism that is not understood. Thereafter, the total body Hb correlates closely with the blood volume. Without measuring the blood volume, one can calculate the "fat-free body weight" (FFBW) from body measurements and skin-fold thicknesses, and this parameter gives a fair measure of the total Hb in the body; the figures (from their resemblance to ordinary Hb readings) are easy to remember—14·2 gm. Hb per kgm. of FFBW for males, and 11·2 gm. for females. In healthy persons, the Hb *concentration* is not closely correlated with these figures, perhaps because in them cells and plasma adjust less to the needs for oxygen carriage and more to such needs as viscosity control. But in anaemic subjects the correlation is close, and in fact "in anaemia haemoglobin concentration gave a reliable assessment of the severity of the condition in the majority of cases". *Alan B. Raper*

FORBES, J. & GELFAND, M. **"Bantu Tropical Anaemia" in Rhodesia.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1961, Mar., v. 55, No. 2, 161–7.

This is a clinical description of 50 African hospital patients in Salisbury whose Hb concentration was less than 50%. In only 12 patients was an obvious cause for the anaemia found. The symptoms and signs of the whole group are tabulated, and reveal the usual variety of pathological conditions, many of which could lead to anaemia, especially when combined in the same patient. Nevertheless, in the authors' view there was no clear cause for anaemia in 38 patients. It was hypochromic in 33, normochromic in 5, macrocytic in 8, and undefined in 4 of the total.

The outstanding clinical facts are that nearly all the patients were young adults, and that the duration of symptoms was usually stated to be brief—less than a month in more than half the patients—but apart from the 9 who had heavy bleeding, only 5 gave a history of blood loss. It is stated that the syndrome is most often seen in those "in close contact with the African environment", but dietary factors are not considered important; the highest social grade is least affected. (In this connexion there is apparently a misprint, in that the social grades quoted in the table are the reverse of those defined in the text.)

[This is a disappointing article. It proposes the name "Bantu tropical anaemia" for what most workers on anaemias in the tropics would recognize at once as a collection of anaemias of very varied aetiology. The authors seem to be conscious of this, but are content to incriminate "a common aetiological factor affecting the African in close contact with the African environment". Such a synthesis is certainly justified, as is the expectation that the anaemia will become less common as social conditions improve, but it is neither helpful nor intellectually satisfying.] *Alan B. Raper*

See also p. 853, GELFAND, **The Anaemic Heart.**

See also p. 831, WALT *et al.*, **The Anaemias in Kwashiorkor.**

TASKER, P. W. G. **Folic Acid and Vitamin B_{12}. Effects of Graded Doses in the Treatment of Tropical Nutritional Megaloblastic Anaemia.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1960, Nov., v. 54, No. 6, 578–81, 1 fig. [19 refs.]

In megaloblastic, tropical, nutritional and pregnancy anaemias there has been doubt as to whether deficiency of folic acid or vitamin B12 or both is the primary cause and whether simultaneous administration of these two substances would potentiate their erythropoietic powers. The author therefore designed a trial to answer these questions and it is one of the few in which statistical methods have been employed in doing so.

From among adult Indians admitted to the General Hospital, Kuala Lumpur, 45 with severe megaloblastic anaemia were studied. They were initially observed for 5 to 15 days during which they were given parenteral iron until the blood values dropped or remained constant. They were then given graded doses of folic acid and vitamin B12 in 15 combinations varying from 0·33 to 3 mgm. folic acid daily and from 0 to 9·0 μgm. vitamin B12 daily for 15 days. Significance of the responses to the treatment is summarized as an analysis of covariance in a table. This showed highly significant differences in effects between dosage levels of folic acid but none between dosage levels of vitamin B12 and there was no evidence of an interaction between the two vitamins or potentiation of one by the other. *A. W. Woodruff*

CHARLTON, R. W. & BOTHWELL, T. H. **Primaquine-Sensitivity of Red Cells in Various Races in Southern Africa.** *Brit. Med. J.* 1961, Apr. 1, 941–4, 2 figs. [30 refs.]

The authors carried out a survey for primaquine sensitivity of the red cells among the various ethnic groups of South Africa, using at first the glutathione stability test, and later a screening test for G6PD activity, though ultimately all positive findings were checked by the latter method.

Positive results were recorded in 10 out of 310 Bantu males, 2 out of 53 Cape Malay males, and 1 out of 29 Bushmen; also in 1 out of 41 Bushman females. No positive findings were obtained in 100 Indian males (who were chiefly of Madrasi origin). In the Bantu, numbers were not great enough to distinguish different tribal incidences of the trait, but the overall incidence of about 3% was much lower than in many East African tribes [ALLISON, this *Bulletin*, 1960, v. 57, 939]. *Alan B. Raper*

ARENDS, T. **Absence of Abnormal Haemoglobins in Colombian Tunebo Indians.** [Correspondence.] *Nature.* 1961, Apr. 1, v. 190, 93–4.

In 100 Tunebo Indians from San Luis de Chuscal, Colombia, no abnormal haemoglobins were detected by paper electrophoresis.

ZUELZER, W. W. & ROBINSON, A. R. **Haemoglobin F: its Significance in the Genetics and Evolution of Haemoglobin.** *Nature.* 1961, Apr. 15, v. 190. 237–40. [14 refs.]

OLIVIA, J. & MYERSON, R. M. **Hereditary Persistence of Fetal Hemoglobin.** *Amer. J. Med. Sci.* 1961, Feb., v. 241, No. 2, 215–17, 1 fig.

A Negro family in Philadelphia is reported in which a man and two of his sisters showed the following proportions of their haemoglobin as Hb F: 22, 20, and 21%. Two other sibs, the mother, and 5 children were normal, and none of those studied showed any evidence of thalassaemia or haemolysis. Such rare and asymptomatic states can only be discovered, as these were, in large surveys. *Alan B. Raper*

CALLENDER, Sheila T., MALLETT, Barbara J. & LEHMANN, H. **Thalassaemia in Britain.** *Brit. J. Hæmatol.* Oxford. 1961, Jan., v. 7, No. 1, 1–8, 4 figs.

Thalassaemia is rare in Britain [this *Bulletin*, 1956, v. 53, 647; 1958, v. 55, 567]. There is therefore very little chance that clinical cases of Cooley's anaemia will occur. Their absence removes the chief pointer to the discovery of the heterozygous state, thalassaemia minor. But there is one condition in which this diagnosis should be considered—refractory hypochromic anaemia. Awareness of this led the authors to diagnose thalassaemia in an English youth of 19, and when this had been confirmed by appropriate studies in his family, a search was made for similar cases seen in the past, with the result that 2 more families with thalassaemia were discovered. In all, 25 persons with thalassaemia minor were found.

Most of the subjects were symptomless, and none had severe anaemia (details are given in 3 tables). As examples of thalassaemia minor they were in no way remarkable except that they had escaped detection. It is useful therefore to abstract, from the full reports in the paper, those features that should arouse suspicion of thalassaemia when hypochromic anaemia is being investigated along the lines that are usual in Britain. These are:—the presence of target cells in the blood smear, a mild polycythaemia, apparent hypochromia with a normal MCHC (indicating thin cells), a normal or raised serum iron, reduced iron absorption and a lack of response to iron, a raised Hb A_2 percentage, and similar changes in relatives.

One interesting clinical correlation emerges. Although no physical signs were found in any of the 3 propositi, the body-build of 2 of them suggested the possibility of occult steatorrhoea. Physicians in northern countries, trained to recognize steatorrhoea, would therefore do well to introduce thalassaemia into the differential diagnosis. *Alan B. Raper*

MODICA, R., LIVADIOTTI, M. & SORRENTI MACALUSO, Anna. Incidenza della sicklemia, pregressa malaria e distribuzione razziale nell'oasi costiera di Tauorga. **[Incidence of Sicklaemia, Past Malaria and Racial Distribution in the Coastal Oasis of Tauorga]** *Arch. Ital. Sci. Med. Trop. e Parassit.* 1960, Nov., v. 41, No. 11, 595–604. [20 refs.] English summary.

This oasis in Tripolitania is within the Province of Misurata, some 300 km. from Tripoli. It has been inhabited for over 200 years by an isolated community of Sudanese origin and 90% are of Negro race. It has been the only known

area of malaria endemicity in Tripolitania but this disease has since been controlled.

The authors have examined blood samples from 260 of the inhabitants representing 14 of the 21 tribes of the oasis, and 4% of the entire population. They used electrophoresis for the demonstration of specific haemoglobin (S) and sought sickle-shaped erythrocytes under the microscope. 242 of the subjects showed the somatic characteristics of the Negro race and 27, or 11·1% of these, had the sicklaemic trait; this compares with an incidence of 4·2–4·5% for the rest of Tripolitania where the Negroes are some 20% of the population. The difference in the 2 incidence rates may be related to the racial distribution, to the recent endemicity of malaria in the oasis or to both factors. The proportion of Negroes in another region of Libya—the Fezzan—is somewhat similar to that in Tauorga, but there is no history of endemic malaria as in the oasis: a survey in Fezzan might well yield results which will clarify the aetiological problem. *J. Cauchi*

See also p. 805, André [**Action of DDS on Sickling**].

Hoerman, K. C., Kamel, K. & Awny, A. Y. **Haemoglobin E in Egypt.** [Correspondence.] *Nature*. 1961, Jan. 7, v. 189, 69–70, 1 fig.

Haemoglobin E is generally thought to be restricted to Asian populations [this *Bulletin*, 1957, v. 54, 212]. The discovery of haemoglobin E in Egypt is therefore of interest. In no less than 9 members of a family of 12 examined, haemoglobin E was discovered. Their faces were not typically Arab but represented, however, the features of average Egyptians and histories taken from the parents of the propositus revealed that the family had resided in the Nile Valley for many generations. Origin by mutation and by racial ties with mongoloids are two of the possibilities which are discussed. In the 13th century, Mongol invasions extended as far as the eastern border of Sinai. *H. Lehmann*

VENOMS AND ANTIVENENES

Hoge, A. R. & Belluomini, H. E. Serpentes coletadas em Jacareacanga, Estado do Pará, Brasil. [**Snakes Collected in Jacareacanga, Pará, Brazil**] *Mem. Inst. Butantan*. 1959, v. 29, 15–16. English summary (2 lines).

Raynolds, A. H. **Venomous Snakes and their Bites.** *Boston Med. Quarterly*. 1960, Dec., v. 11, No. 4, 105–13.

The author discusses the factors which may be concerned in the outcome of snake bite. The size of the snake and the capacity of the venom sacs are important; the larger the snake the greater the sac and the contained volume of venom. The length and type of fangs are important. The fangs of Elapidae, for instance, are short and grooved and the trauma produced, even by a

successful bite, is relatively small compared with that caused by the fangs of vipers which may be as long as 25 mm. and are canalized, making for much more efficient delivery of venom into the wound. Anteriorly placed fangs (as in Elapidae and Viperidae) are much more effective than those placed posteriorly (as in Colubridae).

The effectiveness of the bite also depends upon the mechanism of the biting. For example factors of importance are the width of the open jaw, the angle of the strike, the opportunities offered for biting, the possibilities for a full-mouth attack. The author quotes an interesting case in which a bite by a coral snake was followed merely by local effects, because the snake had been able only to nibble at the patient's foot through his slippers, and had thus been prevented from making a clean bite.

The dose of venom administered depends to some extent on the capacity of the venom sac, the volume of venom available at the time of biting, the anatomical site of the bite and whether the bite is penetrating, tearing or scratching. The presence of protective clothing at the time of bite may also be very important.

The effectiveness of the venom depends on its intrinsic toxicity. Neurotoxic venoms are more toxic weight for weight than haemotoxins. A very small weight of neurotoxic venom may cause death. The lethal dose for man of *Notechis* venom, for instance, is only 2 mgm. whereas that of *Crotalus* venom is 140 mgm., the respective yields of venom for the two snakes being 35–45 mgm. and 200–300 mgm. The habits of the snake are also important. Most are nocturnal. Those which are domésticated, *i.e.*, live near human habitations, are more dangerous than those which are wild because the possibilities of snake-man contact are greater.

There is little doubt of the effectiveness of some specific antivenenes, especially for crotalid and cobra bites. The effectiveness of non-specific antivenenes is more variable. There may be some broad group overlap; for instance, cobra antivenene has some action against coral snake venom. The significant points about antivenenes are their composition, for example whether horse or bovine in origin, and their effectiveness separately in a monovalent serum or in a polyvalent mixture. The distribution and availability of the antivenene and of the snakes concerned are important. Sensitivity to serum must always be tested for by both intradermal and conjunctival techniques. Even when these tests are negative, occasional fatal anaphylaxis may occur. Where the patient is proved sensitive, antivenene cannot be given; desensitization takes too long. Occasionally bovine or dealbuminized serum may be available. Otherwise, there remain the older methods of tourniquet, suction and incision. Some routine of this sort is probably necessary as first aid until proved otherwise. When antivenene is available within 30 minutes, the patient should be kept quiet. A tourniquet for crotalid bite should be applied tightly enough to impede both lymphatic and venous but not arterial flow. It should be released for 1 minute every 30 minutes. In elapid bites, the circulation should be obstructed completely, thus isolating the extremities from the rest of the body. The author considers that it is better to have a loss of limb than a loss of life. [This isolationist attitude does not appeal to the reviewer, nor does it take into account the very rapid absorption of neurotoxic venom recently demonstrated by REID, this *Bulletin*, 1957, v. 54, 747, 1352.] Incision and suction may remove some venom in crotalid bites if a loose tourniquet is applied. The use of ice packs should be re-evaluated. *B. G. Maegraith*

KOCHVA, E. **A Quantitative Study of Venom Secretion by** *Vipera palaestinae*. *Amer. J. Trop. Med. & Hyg.* 1960, July, v. 9, No. 4, 381–90, 5 figs. [19 refs.]

Among 303 cases reported in Israel between 1951 and 1953 of bite by *Vipera palaestinae* in which no antiserum was used, approximately 6% were fatal, 13% severe and the rest moderate or light [this *Bulletin*, 1959, v. 56, 974]. This variability in injury may have been due to differences in the initial state of the victim's health, in the location of the bite or in the quantity or concentration of the injected venom. In the present study the author has attempted to determine the individual differences in specimens of *V. palaestinae* in general yield and concentration of venom, the quantity produced, stored and injected, the influence of temperature on venom secretion and concentration, and the relation, if any, between the venom yield and the size of the snake. He has also studied the influence of sustained milking on venom yield and concentration.

150 *V. palaestinae* were examined, varying in age from just hatched to 2 years or more. The snakes were provided with water *ad lib.* and 2 white mice weekly. The venom was milked into separate containers and dried over calcium chloride. Some snakes were kept at a temperature of 30–35°C. during the winter; the body temperature of the snake was not recorded.

A snake separately caged and properly kept could be milked regularly over 3 years or more. With artificial heating, milking could be continued throughout the year. Ecdysis, pregnancy or food consumption had no effect on the yield. Taking into account the amounts and concentration of venom obtained as well as the physical wellbeing of the snakes, a period of one month between each milking appears to be optimal. A rise in ambient temperature increased both the amount and concentration of venom. Freshly secreted venom is dilute initially and subsequently concentrated by reabsorption of water. The amount of venom injected in a single bite was estimated by allowing the snake to strike a dead mouse. The amount injected was found to range from nothing to 190 mgm. [See also REID, *ibid.*, 1957, v. 54, 747.] The average was something less than 50 mgm. The amount injected was in most strikes less than 15% of the available venom. This is a significant point in relation to the varying severity of viper bites in human beings, since the minimal lethal dose of *V. palaestinae* venom in man is approximately 75 mgm. *B. G. Maegraith*

GITTER, S., LEVI, Gisela, KOCHWA, S., DE VRIES, A., RECHNIC, Jadwiga & CASPER, J. **Studies on the Venom of** *Echis colorata*. *Amer. J. Trop. Med. & Hyg.* 1960, July, v. 9, No. 4, 391–9, 8 figs. [22 refs.]

According to the authors, although *Vipera palaestinae*, the venomous snake inhabiting densely populated coastal areas, has been responsible for the great majority of snake bites in Israel, the danger of bites from *Echis colorata* and other desert snakes such as *Aspis cerastes*, is increasing with the extension of settlement to previously uninhabited desert areas. Although bite from *E. colorata* has not yet been reported, this study was undertaken because of the well-known dangers of bite from *E. carinata* in Africa and India.

Toxological and biochemical studies of the whole venom and its fractions separated by ion exchange chromatography [this *Bulletin*, 1960, v. 57, 1211] were

carried out and a specific antiserum was prepared from rabbits. *In vivo* effects of venom in mice were haemorrhage, nervous system disturbance, anaemia, thrombocytopenia and afibrinogenaemia. The LD50 in mice weighing 20 gm. was 31 μgm. intraperitoneally and 11·5 μgm. intravenously. *In vivo* activities of the venom were protease, phosphatidase, hyaluronidase, 1-amino-acid oxidase, procoagulant, anticoagulant, fibrinogenolysin and fibrolysin. Haemorrhage appeared mainly to be due to damaged blood vessel walls. The afibrinogenaemia and thrombocytopenia were contributing factors. Afibrinogenaemia occurring after injection of whole venom was mainly the result of the fibrinogenolytic action of the whole venom. The differences observed in the blood-coagulating properties of various viperine venoms are probably due to the relative strengths of the relevant procoagulant and fibrolysin factors.

The haemorrhagin appears to be the primary haemorrhagic factor. Haemorrhage into the abdominal muscles, the diaphragm and the peritoneal cavity induced by intraperitoneal injection are the most striking pathological changes. Haemorrhage into the lungs and heart muscle after intravenous injection of the venom indicates damage to the intercellular and interendothelial spaces, with subsequent dissolution of the walls of the vessels. Intravenous injection of a mixture of venom and specific antiserum (rabbit) was not followed by the characteristic haemorrhage. The animals survived without developing anaemia, although there were thrombocytopenia and afibrinogenaemia. The latter must therefore be considered only as contributing factors to the pathogenesis of a haemorrhage. Intraperitoneal injection of venom-serum mixture did not lead to afibrinogenaemia or thrombocytopenia, suggesting that the factors concerned could penetrate the vessel walls only when these were already damaged by the haemorrhagin.

The specific antiserum was able to neutralize the lethal activity and the haemorrhagic activity of the protease, but did not affect the other factors. The serum possesses antibodies against some of the components of *E. colorata* venom and is capable of delaying death in mice injected with that venom. Until a specific antiserum for *Echis colorata* is available, therefore, it can be presumed that the *Vipera palaestinae* antivenene [*ibid.*, 1959, v. 56, 771, 1273] may be of some value in human cases of *E. colorata* bite. *B. G. Maegraith*

STIMSON, A. C. & ENGELHARDT, H. T. **The Treatment of Snakebite.** *J. Occup. Med.* Chicago, 1960, Apr., v. 2, No. 4, 163–8, 9 figs. [13 refs.]

This paper describes a very interesting study of the circumstances surrounding snake bite. The history of the bite is most important and the examination of the offending snake is most desirable in the correct diagnosis of the species. Most snakes are active at night. Bites may occur without intoxication. In such cases there may have been a badly aimed or superficial bite, or the snake may have recently emptied his poison gland. [A third possibility pointed out by REID, [this *Bulletin*, 1957, v. 54, 747] is not discussed by the authors, *i.e.* the bite may have been satisfactory, the glands full, and yet no venom was injected.]

In discussing first-aid treatment the authors point out that damage caused by well-meaning persons attempting first aid may be disastrous. The patient may be exposed to greater danger in this way than by the delay involved in getting him to medical help, if this can be done within the hour. The authors insist

that the patient should be kept calm. If bitten on an extremity, a tourniquet may be applied, above the wrist or ankle, loosely enough to retard the venous return but not the arterial [the authors write "so loosely as not to retard the venous return"]. Another tourniquet may be tied above the elbow or the knee. Crushed ice in a cloth should be applied to the actual bite wound. The ice should not come into direct contact with the wound; there are valid arguments against continuous cooling of the limb. The usual advice of giving strong coffee and avoiding alcohol is given without any explanation. The patient should be carried and should not be allowed to walk. If he is alone, he should walk slowly. The snake should be killed and brought in for identification.

The physician, on admission, should remove the tourniquets and sedate the patient. The blood should be grouped and classified, an erythrocyte count should be made, and the patient tested for sensitivity to serum. The state of oedema should be recorded by measurement of the circumference of the limb at various distances above the wound. When the wound has been identified as a snake bite, and after the area has been washed, the fang marks can be connected by an incision half an inch deep by using local anaesthesia. This should be done only if the patient is seen within 4 hours of being bitten. If the oedema is excessive, light incisions about a quarter inch deep in these areas should also be made and suction cups applied for periods of 2 hours at a time, with short rest intervals between. This should go on for up to 8 hours. When the oedema is controlled, the limb should be wrapped in a towel containing cracked ice. Sensitivity to serum is tremendously important. Even if the skin tests are negative, there may still be some anaphylaxis or serum sickness. Serum should only be given in severe cases and only by those trained to give it. Serum sensitivity reactions are often more serious than the effects of the venom. The therapeutic value of antihistamine and cortisone compounds is uncertain. Tetanus and gas gangrene are possibilities and antiserum may be necessary. *B. G. Maegraith*

SCHENBERG, S. Análise da crotamina no veneno individual de cascavéis recebidas pelo Instituto Butantan. [**Analysis of Crotamine in the Venom of Individual Rattlesnakes Received in the Instituto Butantan, Brazil**] *Mem. Inst. Butantan.* 1959, v. 29, 213–26, 1 fig. English summary.

HENRIQUES, Olga B., FICHMAN, Mina, HENRIQUES, S. B. & DE OLIVEIRA, Maria C. F. **Fractionation of the Venom of** *Bothrops jararaca* **by Ammonium Sulphate. Purification of some of the Fractions obtained.** *Mem. Inst. Butantan.* 1959, v. 29, 181–95, 2 figs. [23 refs.]

MAENO, H.; MITSUHASHI, S.; SATO, R.; OKONOGI, T.; HOSHI, S.; HONMA, M.; SAWAI, Y. **Studies on** *Habu* **Snake Venom. 2c. Studies on Hβ-Proteinase of** *Habu* **Venom** [MAENO, MITSUHASHI & SATO]. *Japanese J. Microbiol.* 1960, Apr., v. 4, No. 2, 173–80, 6 figs. [17 refs.] **3–2. A Comparative Study of Histopathological Changes caused by Crude Venom, Purified** *Habu*-**Proteinase and other Proteinases** [OKONOGI, HOSHI, HONMA, MITSUHASHI, MAENO & SAWAI]. *Ibid.*, 189–92, 3 figs.

See also this *Bulletin*, 1961, v. 58, 251.

ROSENFELD, G., HAMPE, O. G. & KELEN, E. M. A. **Coagulant and Fibrinolytic Activity of Animal Venoms; Determination of Coagulant and Fibrinolytic Index of Different Species.** *Mem. Inst. Butantan.* 1959, v. 29, 143–63, 9 figs. [13 refs.]

BÜCHERL, W. Escorpiões e escorpionismo no Brasil. IX. Combate ao escorpião, *Tityus serrulatus* (Buthidae, Tityinae), nos terrenos da General Motors do Brasil, em São José dos Campos, Estado de São Paulo. [**Scorpions and Scorpionism in Brazil. IX. Combating the Scorpion** *Tityus serrulatus* **(Buthidae, Tityinae)**] *Mem. Inst. Butantan.* 1959, v. 29, 243–53, 5 figs.

The author works in the world-famous Institute of Herpetology at Butantan and this is the 9th report dealing with the problems of scorpions, but it deals especially with the yellow scorpion *Tityus serrulatus* which is found in several States of Brazil. This scorpion is domestic, living in and around human habitations, and the author states that it is one of the most poisonous in the world, the mouse LD50 (subcutaneous) being between 0·3 and 0·5 μgm./gm. As might be expected, most fatal cases occur in children.

The report then deals with the problems arising out of an infestation by these animals of a construction site for a new assembly plant for General Motors Co. in São Paulo State. Here a number of wooden bungalows had been put up to house temporarily some of the workers on the construction site, while large piles of cut timber lay around. *T. serrulatus* was found breeding in very large numbers under the bungalows and in between the balks of timber so that there was a serious risk of poisoning.

After discussions at all levels, from the chief constructional engineers downwards, it was decided that spraying was the best method of dealing with the scorpions combined with their regular trapping, and instruction of the men on the site. The scorpions were collected by means of damp sacks spread on the ground around the bungalows, from beneath which they were collected next day. Spraying was first by BHC, but later DDT and Rhodiatox (diethyl-paranitrophenyl-thiophosphate) in 10% solution were used. The breeding sites were sprayed once a week or at least 3 times a month for 3 months.

As permanent buildings were gradually erected the scorpions practically disappeared, but the author gives a warning that in laboratory experiments *T. serrulatus* began to show an increasing resistance to these insecticides, and as conditions are still propitious for their breeding great care still needs to be taken.

It is considered that these scorpions were first brought into the area with the constructional timber, as the local species is *T. bahiensis.* *W. K. Dunscombe*

BÜCHERL, W. Escorpiões e escorpionismo no Brasil. X. Catálogo da coleção escorpiônica do Instituto Butantan. [**Scorpions and Scorpion Poisoning in Brazil. X. Catalogue of the Collection of Scorpions in the Instituto Butantan**] *Mem. Inst. Butantan.* 1959, v. 29, 255–75.

BETTINI, S. Indagine sui casi de latrodectismo verificatisi negli anni dal 1938 al 1958 in alcune province d'Italia. Nota III. Provincia di Roma. **[Survey on the Cases of Latrodectismus occurring during the Years from 1938 to 1958 in some Provinces of Italy. Note III. The Province of Rome]** *Riv. di Parassit.* Rome. 1960, Dec., v. 21, No. 4, 307–17, 5 figs. English summary.

The author has already published the results of his investigations into the incidence of this spider bite in the Provinces of Viterbo [this *Bulletin*, 1960, v. 57, 1107] and of Grosseto [*ibid.*, 1961, v. 58, 122] and he now reports his findings for the Province of Rome. Here again he has searched among the admissions of the provincial hospitals and infirmaries, during the period 1938–1958, for cases of "arthropod bite" and of snake bite, and he found that 172 of the former and 50 of the latter had been treated at the hospitals of Civitavecchia and Velletri and at the infirmary of Bracciano.

As in his previous surveys, he classified the cases of arthropod bites, on the basis of the circumstances recorded, into 3 groups according to the degree of probability that they had been caused by *Latrodectus tredecimguttatus*: 74 were highly probable, 60 were probable and the remaining 38 were unlikely. The 134 assumed true cases, represented by the first 2 groups, had a local geographical distribution which roughly corresponded to that of *L. tredecimguttatus* itself as found by GIULIANI. Most of these spider bites occurred in the summer months, and there was a very sharp increase in the number of cases during 1947–1948.

The hospitals in the City of Rome were not included in these investigations, but the author records a fatal case in a patient admitted to one of them.

He briefly refers to the topography of the Province, which includes the Tiber Valley, the Alban and other hills, the Lake of Bracciano, the Roman Campania and the coast. *J. Cauchi*

SCHENONE, H. & PRATS, F. **Arachnidism by** *Loxosceles laeta*. **Report of 40 Cases of Necrotic Arachnidism.** *Arch. Dermat.* 1961, Jan., v. 83, No. 1, 139–42, 3 figs.

Arachnidism, when produced by *Loxosceles laeta*, a common house spider in South America, may present two clinical pictures:—the localized cutaneous necrotic loxoscelism, and the severe systemic haemoglobinuric viscero-cutaneous loxoscelism. In this report a study is presented of 40 cases, 4 of which were of the severe form.

L. laeta exists in Chile, Uruguay and Peru. It is 1·5 cm. in length, yellowish brown, with the abdomen darker than the cephalothorax. The legs are long and covered with fine hairs. It is found in old houses, inside cracks in walls and ceilings, behind pictures and furniture and inside clothing. It does not attack, but bites when molested. *L. reclusus*, which produces similar lesions, has been described in the U.S.A. [this *Bulletin*, 1958, v. 55, 1044].

Cutaneous necrotic loxoscelism manifests itself by a severe necrotic local reaction at the site of the bite. Within an hour a painful rose-red oedema develops, which may become darker as it increases in size. More than half the face and neck may be affected. The centre of the plaque becomes dark, violaceous, almost black and gangrenous, and a central eschar develops. The general

symptoms are mild nervousness, insomnia and pyrexia. Gradually the oedema subsides. The course of the plaque is that of a gangrene.

Viscero-cutaneous loxoscelism is rare and only 4 patients were observed. The local reaction is similar to the one described above; but within 24 hours there is a sharp rise of temperature to 103° or 104°F. Haematuria develops almost invariably on the first day. Anuria and icterus are related to the degree of haemolysis and the latter seldom lasts more than 5 to 7 days. The urine contains red blood cells, haemoglobin and albumin.

There were 13 males and 27 females in this series, in age ranging from 3 to 72 years. 31 were seen in spring and summer; only 9 in autumn and winter. Brief clinical rates are given. The ulceration, after removal of the eschar, especially on the face, may be very severe, necessitating skin grafts for repair. In severe cases with haemolysis, corticotrophin and corticosteroids should be given by injection as early as possible. In the localized cases, antihistaminics were found satisfactory.

[The authors point out that 27 of these cases have been published already, this *Bulletin*, 1959, v. 56, 1058, 1185.] *Philip Manson-Bahr*

TOXOPLASMOSIS

De Roever-Bonnet, H. **Influence of a Few Fluid Media on** *Toxoplasma* **Parasites.** *Trop. & Geograph. Med.* Amsterdam. 1960, Mar., v. 12, No. 1, 71–81, 19 graphs.

The human "Ang." strain of *Toxoplasma gondii* was exposed to the effect of various fluid media to find the most suitable one for maintaining the organism. The experiments were carried out with inocula of 10, 100 and 1,000 parasites respectively because a few organisms are as capable as many thousands of causing a fatal outcome. Groups of 10 mice were used for each test, after storage of the suspension for 2 hours and 24 hours respectively at 4°C.; a few tests were done after storage at room temperature, but the organisms failed to survive such treatment in any medium.

10% serum and undiluted milk gave the best results, and it was noticed that ordinary milk was better than skimmed. 1% freshly prepared (but not old) mouse brain emulsion and 1% bovine albumin fraction V in saline were almost as good. Buffer solutions as used in the dye test did not support the organisms well, and chicken embryo emulsions and physiological saline solution proved equally unsuitable. Tap water was completely useless.

These results suggest that quantitative studies of *Toxoplasma* should utilize media which ensure the viability of a large proportion of the organisms.

P. C. C. Garnham

Harding, J. D. J., Beverley, J. K. A., Shaw, I. G., Edwards, B. L. & Bennett, G. H. **Toxoplasma in English Pigs.** Reprinted from *Vet. Record.* 1961, Jan. 7, v. 73, No. 1, 3–6, 8 figs. on 2 pls. [11 refs.]

"Toxoplasma has been isolated from pigs in Worcestershire. The principal signs of illness were dyspnoea and wasting in piglets. Lesions and organisms

were seen in the lung, liver, kidneys and lymph nodes of piglets and *Toxoplasma gondii* was recovered by mouse inoculation from the brain of the piglets' mother. Serum samples from apparently healthy pigs on the premises gave titres of from 0 to 1 : 72 in the Sabin-Feldman dye test."

SMITH, I. D. **Ovine Foetal Resorption caused by** *Toxoplasma gondii* **Infection.** [Correspondence.] *Nature*. 1961, Mar. 18, v. 189, 939.

GARNHAM, P. C. C. & LAINSON, R. **Sheep as a Potential Reservoir of** *Toxoplasma* **for Man.** *Lancet*. 1960, July 9, 71–4, 3 figs. [10 refs.]

Although toxoplasmosis in sheep has been recorded in a number of cases [this *Bulletin*, 1957, v. 54, 875; 1959, v. 56, 977], the role of mutton as a source of human infection has not been properly investigated. With this end in view, the authors studied experimental toxoplasmosis in sheep. A number of lambs were inoculated by various routes with triturated brain material from mice infected with an ovine strain of *Toxoplasma*. The infection was determined by the dye test, and parasites were isolated by inoculation of multimammate rats with material from the brain and muscle biopsy. Toxoplasms were found in the brain, muscles, liver and kidney of the infected lambs. In order to ascertain the viability of the parasites, a leg of one of the infected sheep was deliberately undercooked, and triturated flesh from a raw portion of muscle was inoculated into multimammate rats, but none became infected. On the other hand, 2 out of 10 rats fed on minced muscle of infected sheep became infected. It was thus demonstrated that "Even gross undercooking . . . killed the organism" and "eating infected meat [mutton] does not constitute a hazard to man in this country".

C. A. Hoare

KULASIRI, C. **The Specificity of the Sabin-Feldman Dye Test with reference to Protozoal Infectons.** *J. Clin. Path.* 1960, July, v. 13, No. 4, 339–48. [30 refs.]

In view of the conflicting results obtained by previous workers regarding the production of antibodies revealed by the dye test in animals infected with various protozoa [this *Bulletin*, 1955, v. 52, 84, 480], the author undertook a detailed study on the specificity of this test in rodents infected or injected with coccidia, leishmaniae, crithidias, trypanosomes and *Lankesterella*. The sera from these animals were stored at −17°C., the accessory factor was provided by human sera, and *Toxoplasma* were obtained from the peritoneal exudate of infected mice. For comparison, complement-fixation tests for toxoplasmosis were made with egg antigens.

The sera used for the dye and complement-fixation tests were taken from (1) intact and splenectomized rabbits infected with *Eimeria stiedae*, (2) intact and splenectomized rabbits injected with *Leishmania enriettii* and guineapigs infected with this parasite, (3) rabbits injected with *Crithidia fasciculata*, (4) guineapigs injected with *Atoxoplasma* [=*Lankesterella*], and (5) mice infected with *Trypanosoma cruzi*. The results of all the complement-fixation tests were negative,

while those of the dye test were either negative or showed insignificant titres ranging from 1 in 16. It is concluded that "no protozoan parasite has been conclusively incriminated as producing dye test antibodies". *C. A. Hoare*

DERMATOLOGY AND FUNGUS DISEASES

FINDLAY, G. H. **Coenzymes I and II in the Human Epidermis. Changes in Nutritional Sun-Sensitivity (Pellagra) and during Cytostatic Drug Therapy.** *South African Med. J.* 1960, Dec. 10, v. 34, No. 50, 1057–9.

"The commonest sun eruption in South Africa is pellagra." This condition is of course a deficiency in nicotinamide. Nicotinamide is part of the pyridine nucleotides, co-enzyme I and co-enzyme II (DPN and TPN). These co-enzymes are altered by ultra-violet light. Furthermore the respiratory metabolism which they catalyse is also influenced by light and sun-sensitizing drugs. The author investigated, for these reasons, the pyridine nucleotide content of skin and blood.

Roughly 10 mgm. of epidermis were obtained, under local anaesthesia, from 1 sq. cm. of skin with a small Volkmann spoon. 48 patients were examined. When normal Caucasian and Bantu patients were compared the blood values in the Caucasians were about 25% higher than those in the Bantu, though both were still within the accepted normal range. There was no obvious change in the co-enzyme levels of the blood in pellagra. The skin level of oxidized phospho-pyridine nucleotides was, in sunlight-dermatosis of pellagra, slightly below normal. It was more consistently below normal in malnutrition associated with pellagra symptoms. The ability to synthesize the co-enzymes was unaffected and the cure of the pellagrous skin condition was accompanied by a rise of the co-enzymes in the skin.

Four experiments were made to see whether cytostatic drugs influenced the level of pyridine nucleotides in blood and skin. The blood levels showed a slow rise and fall over a 3-week period in 2 cases but the skin changes could not be related to these observations. *H. Lehmann*

BELFORT, E., LACAZ, C. da S. & SAMPAIO, S. A. P. Tinea nigra palmaris. Registro do primeiro caso em São Paulo, com a descrição do agente etiológico. [**Tinea Nigra Palmaris. Report of the First Case in Sao Paulo, Brazil, with Description of the Aetiological Agent**] *Rev. Paulista Med.* 1960, Dec., v. 57, No. 6, 386–97, 7 figs. [28 refs.]

The English summary appended to the paper is as follows:—

"The first case in Sao Paulo, Brazil, of tinea nigra localized at the palmar aspect of the hand is reported; a fungus identified as *Pullularia werneckii* was isolated from the lesion.

"A review of the literature points out the clinical identity between tinea nigra, described by Castellani in Asia, and keratomycosis nigricans palmaris, first seen in Bahia in 1891 by Castro Cerqueira. Mycological study of our material has confirmed the findings of Carrión (1950). Asexual organs of reproduction as

well as two different types of colonies were seen: the yeastlike and the membranous types. According with De Vries (1952) and Seeliger (1957) the fungus is placed in the genus *Pullularia*, species *werneckii*. The species *mansoni*, isolated by Castellani in 1905, is considered nomen dubium."

TROPICAL OPHTHALMOLOGY

TARIZZO, M. L.; NATAF, R.; DAGHFOUS, T. Études sur le trachome. 1. Isolement et culture en série de 12 souches de virus sur oeuf embryonné [**Studies on Trachoma. I. Isolation and Serial Culture of 12 Strains in Embryonated Eggs**] [TARIZZO]. *Bull. World Health Organization*. Geneva. 1961, v. 24, No. 1, 103–5. 2. Action des antibiotiques sur le virus du trachome cultivé dans les oeufs embryonnés [**II. Action of Antibiotics on the Virus Isolated**] [TARIZZO, NATAF & DAGHFOUS]. *Ibid*., 107–13. [12 refs.]

I. The author records the results of his endeavours to isolate trachoma virus from clinical cases of this disease in Tunisia. Suspensions of conjunctival scrapings were injected into embryonated eggs by the yolk sac route and passage made on death of the embryo or blindly about the 6th or 7th day. Passage was discontinued if still negative at the 6th. 12 strains were isolated from 25 patients, 10 from 19 in stage Tr. II and 2 from 6 in stage Tr. III; a successful outcome proved likely in those cases where the virus could be demonstrated microscopically in conjunctival smears. The inability regularly to isolate trachoma virus from cases of clinical trachoma suggests to the author that more than one aetiological agent may be concerned.

II. This paper presents the findings in some early studies on the sensitivity of trachoma virus to a number of antibiotics. One strain only of trachoma virus was used and the action on it of chloramphenicol, chlortetracycline, erythromycin, framycetin, oleandomycin, oxytetracycline, penicillin, polymyxin B, spiramycin and streptomycin was investigated. This was done in the embryonated egg in two ways. In the first a suspension of a known amount of virus was mixed with the antibiotic in varying concentration and after periods of 1, 4 and 24 hours' contact at 4°C., inoculated into embryonated eggs. The other method consisted of infecting the egg and administering the antibiotic in varying dose 48 hours later. In both series survival or death and the day of death were observed and recorded; confirmation of the viral cause of death were sought. The findings in the two types of experiment were similar. Streptomycin and polymyxin were without action. The remainder were active in varying degree and of these erythromycin was the most potent.

S. P. Bedson

SCOTT, J. G. **Long-Acting Sulpha Drugs in Trachoma.** *Med. Proc.* Johannesburg. 1961, Mar. 11, v. 7, No. 5, 91–2.

" 1. Blanket treatment with eye ointment used 5 days each month for 6 months, followed by individual treatment for un-cured cases, is recommended to eliminate trachoma in an endemic area.

"2. Individual treatment consists of a long-acting sulpha drug for 2 weeks with a second course of eye ointment used twice daily for 5 days each month for 3 months.

"3. Trained field workers are necessary to assist the work."

MISCELLANEOUS DISEASES

LAUCKNER, J. R., RANKIN, A. M. & ADI, F. C. **Analysis of Medical Admissions to University College Hospital, Ibadan—1958.** *West African Med. J.* 1961, Feb., v. 10 (n.s.), No. 1, 3–32. [55 refs.]

The incidence of disease in West Africa may be assessed from the annual reports of government medical departments, which usually contain lists of in-patient and out-patient diagnoses of doubtful reliability, from the results of surveys, either intensive or extensive [this *Bulletin*, 1951, v. 48, 685; 1957, v. 54, 106], and from the pathologists' reports on the results of post-mortem examinations.

The authors make a careful analysis of the admissions to the medical wards of the University College Hospital, Ibadan, Nigeria, during 1958. An analysis of the diseases diagnosed in the out-patient department of the same hospital from April 1957 to April 1958 has already been made by COBBAN [*ibid.*, 1960, v. 57, 297]. Most of the children under the age of 10 years were admitted to the paediatric wards and are not included.

Within these limits the authors give a concise and illuminating analysis of the diseases they encountered.

Medicine in the tropics is shown to be very different from "Tropical Medicine", although it is admitted that, in Nigeria, diseases such as malaria are of great importance in out-patient and paediatric practice. There are also variations from similar surveys made in Europe; in Ibadan 80% of those admitted are less than 40 years old; the preponderance of infections underlines the low standard of environmental hygiene.

1,384 admissions are analysed, 825 males and 559 females; the average stay in hospital was 22·7 days. 947 patients came from Ibadan city. 268 patients died of whom 139 were examined post mortem; 115 deaths were due to infections, 50 to tetanus which was the commonest single cause of death.

In 10 of the 86 admissions for tetanus the portal of entry was identified as a guineaworm ulcer. There were 199 admissions for tuberculosis (33 deaths); most patients with tuberculosis are treated as out-patients. Typhoid (33 admissions with 8 deaths) was relatively uncommon in Ibadan as compared with Uganda and Accra [see *Bull. Hyg.*, 1952, v. 27, 1096; 1956, v. 31, 501]. The 85 cases of pneumonia admitted, with 3 deaths, are classified as "respiratory", and not "infectious".

Hypertension is the commonest cardiovascular disease in Ibadan but most patients are treated as out-patients; no less than 29 admissions were diagnosed as rheumatic heart disease (4 deaths); this diagnosis was previously made reluctantly but it is now clear that the condition is not uncommon.

Other important figures are 41 admissions for diabetes, which supports DODU's reports from Accra [*West African Med. J.*, 1958, v. 7, 129], and 41 peptic ulcers.

The authors make interesting comments on the importance of poliomyelitis, the causes of haemolytic anaemia, obscure encephalitis, and the problems of treating psychiatric disease in West Africa. It is not possible to summarize the comments and figures for the other diseases analysed and those interested in the pattern of disease in patients admitted to a hospital in the forest belt of West Africa, are referred to the original. *M. J. Colbourne*

GANS, B. **Paediatric Problems in Lagos.** *West African Med. J.* 1961, Feb., v. 10 (n.s.), No. 1, 33–46, 1 fig.

The author, after working for a year in Lagos in the Medical paediatric ward (42 beds) of the General Hospital, is impressed with the importance of disease of children in a country where half the population is below the age of puberty. Paediatric care can only be based on an accurate assessment of the incidence of disease. The diagnoses made in this ward from February 1959 to January 1960 are used to give an indication of this incidence.

There were 2,355 admissions, almost all of children below the age of 6 years, and 896 deaths. The number of nurses and laboratory staff available was "sub-optimal". The 5 groups accounting for 60% of the admissions and 71% of all deaths, were as follows:—

Respiratory Diseases (excluding tuberculosis and measles bronchopneumonia) ..	20·9% of all admissions	34·7% case mortality
Death soon after admission without diagnosis	12·9% „ „ „	100% „ „
Enteritis	11·5% „ „ „	35·7% „ „
Measles	7·9% „ „ „	22·7% „ „
Kwashiorkor	7·7% „ „ „	45% „ „

Other important diseases were tuberculosis, tetanus, poliomyelitis, and conditions associated with jaundice.

Details are given of the treatment adopted, and changes made during the year.

The author is surprised at the absence of filariasis, schistosomiasis, and trypanosomiasis in spite of the emphasis placed on these conditions in tropical medicine courses in temperate climates.

"It was necessary to learn and constantly to remember that every illness was superimposed on a variegated background of malnutrition or starvation, malaria, anaemia, and parasitic infestation" but the author then emphasizes "the paucity of tropical diseases as commonly understood".

He is justifiably appalled at the figures he quotes and pleads for the integration of the curative and preventive medical services. He considers that present planning is based on an unrealistic appreciation of the situation.

He recommends more emphasis on protection against poliomyelitis, tetanus, measles (when it becomes feasible) than against diphtheria and whooping cough. He also recommends vaccinating all infants born in Lagos with BCG, by the Heaf multiple puncture technique.

[Although the author gives a lively description of much hard work under difficult conditions and is clearly anxious to find some method of improving the preventive and curative medical services, it is hard to understand his complaint that tropical medicine courses do not prepare their students for these conditions; he rightly emphasizes the importance of malaria, kwashiorkor and parasitic infections; that many pathological conditions are suffered by the same child at the same time is well recognized by teachers of tropical medicine everywhere; it would be surprising to find the rural diseases, trypanosomiasis and schistosomiasis, in Lagos. Some of the author's observations are unexpected; few pathologists experienced in the tropics would consider that deaths from cerebral malaria are hard to diagnose; in most hands there is good correlation between the results of the slide tests for sickling and electrophoresis.] *M. J. Colbourne*

SINGH, A., JOLLY, S. S. & KUMAR, Leela R. **Indian Childhood Cirrhosis.** *Lancet.* 1961, Mar. 18, 587–91, 7 figs. [33 refs.]

There are two special and relatively common forms of cirrhosis of the liver in childhood; veno-occlusive disease in Jamaica, and childhood cirrhosis in India. The authors discuss the clinical and pathological findings, and the possible causes in the light of their studies of 114 children with the latter disease in the hospital of Patiala in the Punjab. They specifically excluded known causes of cirrhosis such as congenital syphilis, infective hepatitis, inborn errors of metabolism, etc.

The majority of the children were between 1 and 3 years of age and there were only 8 girls in the series. Though the area served by the hospital was predominantly Sikh, only 33 of the children were of this sect. No less than 56 of them were of a particular Hindu sect, the Bania Aggarwal, who are strictly vegetarian and very endogamous.

The disease can be divided clinically into 3 groups: fulminant, acute, and subacute. In the fulminant type the child generally dies within 1 month of onset, in the acute within 3 months, while in the subacute he may survive for up to 1 year. Very few recovered. Hepatomegaly occurred in all cases, and splenomegaly in 84%. Features of liver failure noted included ascites in 70%, jaundice in 67%, and abnormal liver function tests in 91%.

Histological findings were made on 85 needle biopsies in 75 patients, as post-mortem examinations were refused. The changes found were mainly of diffuse cell necrosis with replacement fibrosis. The necrosis included ballooning of the cells, with karyolysis, and degeneration into smudged and eosinophilic masses. The fibrosis was typically portal, leading eventually to complete loss of hepatic architecture. Though searched for carefully, no veno-occlusive changes were found.

There appears to be a strong hereditary factor. More than 1 child in the family was affected in 48 instances. There is also the predilection for the male sex, suggesting the possibility of a sex linked genetic factor.

The authors did not consider that malnutrition was the most important cause, pointing out that 80% of the children were breast-fed, and that the mothers did not come from the poorest families. They feel, however, that a combination of malnutrition with a genetic predisposition may be responsible. They do not consider that the histological changes resemble those of infective hepatitis,

though they agree that the eosinophilic masses could suggest a virus infection. Experiments in which they inoculated filtrates of stools from these children into newly born rats did not give any positive results. There was no evidence of rhesus incompatibility being a cause. No toxic factors analogous to the bush teas of veno-occlusive disease could be found. *A. C. E. Cole*

GELFAND, M. **The Anaemic Heart.** *Central African J. of Med.* 1961, Jan., v. 7, No. 1, 10–15, 6 figs.

From this study in Salisbury, Southern Rhodesia, patients with anaemia secondary to acute haemorrhage or anaemia associated with icterus were excluded and only those whose anaemia was of gradual onset and who had a haemogloblin of 40% or less were accepted.

Soon after admission an electrocardiogram and an X-ray examination of the heart were taken in 40 cases. The cardiac thoracic ratio was greater than 50% in 17 of these. The degree of enlargement was mild in 2 patients, moderate in 10 and severe in 5. There appeared to be little correlation between the degrees of enlargement and the severity of the anaemia. Enlargement was general and signs of congestive failure were not striking. Neck veins if distended were only slightly so and the liver was not enlarged unless there was concomitant cirrhosis. Oedema of the ankles and legs was common but was considered to be due to anaemia rather than heart failure. From among 29 electrocardiographs studied, 19 were normal and 10 showed changes which were considered abnormal but not grossly so. Some enlarged hearts were slow to resume their former size despite an appreciable improvement in the blood picture. *A. W. Woodruff*

ABRAHAMS, D. G. & ALELE, C. A. **A Clinical Study of Hypertensive Disease in West Africa.** *West African Med. J.* 1960, Oct., v. 9 (n.s.), No. 5, 183–93, 5 figs.

These workers had earlier found that essential hypertension is common among Western Nigerians and that their blood pressures and blood pressure patterns when related to sex and age differ in no important details from those of white communities. This further report has been compiled from the records of 100 patients who attended University College Hospital, Ibadan, with cardiovascular disease during 1958–1959. The criteria for inclusion in the study were hypertension with a complication in patients over the age of 20 years. Between the ages of 20 and 40 the sexes were equally represented in the series but beyond that age the proportion of males diminished.

One patient had coarctation of the aorta, 71 had essential hypertension and 28 renal hypertension. The incidence of the last two conditions was similar in each sex, and in both sexes the incidence of renal hypertension was maximal between the ages of 40 and 50. Malignant hypertension was diagnosed when papilloedema was present; 5 patients were so classified and in 2 of them the "malignant transformation" had occurred on the basis of essential hypertension. Cardiac failure, either alone or in combination with renal failure, occurred in nearly 70% of cases but there was no case of cardiac infarction so that the incidence of uncomplicated hypertensive heart failure was unusually high.

Renal failure and cerebrovascular accidents were not uncommon and several patients had more than one complication.

10 patients are known to have died during the year of observation but it is thought that many more did so and could not be traced.

Most of the patients were illiterate and the difficulty of interpreting symptoms in such patients is appreciated by the authors; more than half complained of chest pain which the authors eventually concluded was really dyspnoea and orthopnoea for which such patients had no descriptive terms. Among 75 illiterate patients only 4 complained of headache, 8 admitted to having had it when questioned and the remainder denied its presence, but 8 of the 25 literate patients complained of it. Headache did not seem to be related to the height of the blood pressure. Two clinical features were remarkable, the apparent immunity to coronary heart disease and the infrequency with which vascular lesions could be seen by retinoscopy.

Only 23 of the patients were aged more than 60 years and this small proportion is related to the fact that census figures showed that in Ibadan Province only 8% of the population lived beyond the age of 50 and that a third of the entire population was below the age of 8. Age therefore remains an important factor in relation to hypertension in this community for 50% of the patients in the series were over 50 compared with only 8% of the general population. Under 12% of the population are literate, yet 25% of the patients were so classified. This, it is considered, is explained by the reluctance with which illiterate patients seek medical advice.

Commenting upon the extraordinary immunity of the African to coronary artery disease, the authors state that their patients relied almost exclusively on palm oil as a source of fat for cooking and that this is mainly unsaturated. The serum lipid levels of Nigerians in the lower income brackets are significantly lower than those of the Europeans. The high incidence of hypertensive heart failure may, the authors think, in part be a result of the prevalence of anaemia in the community studied. Anaemia places an added load on the heart and its correction is an essential part of the therapy of congestive heart failure.

A. W. Woodruff

WILLIAMS, F. M. W., HAMILTON, H. F., SINGH, B. & HERLINGER, R. **Tropical Eosinophilia in British Guiana—a Preliminary Report.** *West Indian Med. J.* 1960, Sept., v. 9, No. 3, 149–55. [10 refs.]

The authors define the syndrome of tropical eosinophilia: clinical features of recurrent spasmodic cough with wheezing and fatigue; physical signs including rhonchi and sometimes coarse basal rales, occasionally enlarged lymph glands or spleen; laboratory findings of an eosinophilia of 2,000 per cmm. or more, with eosinophils in the sputum and an excess in the bone marrow; typical radiological changes; and a therapeutic response to diethylcarbamazine or the organic arsenicals.

They observed 72 patients with the syndrome in 3 years in British Guiana. 57 met all the diagnostic criteria. There were 39 East Indians, 11 Africans, 2 Portugese, and 5 others, supporting the observation of DANARAJ [this *Bulletin*, 1958, v. 55, 920] in Singapore that the disease was more prevalent among Indians. 46 of their patients were children and only 11 adults. They twice observed the

occurrence of more than one patient in a family. They also comment on the lack of correlation between the degree of eosinophilia and the intensity of symptoms, and point out that improvement in both may occur without treatment.

Radiological signs were classified as follows:—

Increased striation in all cases, reticulation in 90%, mottling, of a fine pin-head type in 35%, of a coarse type greater than 3·5 mm. in 4%, pleural thickening in 30%. Consolidation of low density and subsegmental distribution, responding to specific treatment occurred in only 3 cases. As a result of treatment oedema responded rapidly, mottling and consolidation more slowly; reticulation improved or disappeared in over half the cases, whereas striation became more pronounced; only 20% showed radiological cure, and 32% were improved, while 48% developed a residual pattern of increased striation and minimal reticulation.

A. C. E. Cole

Basu, S. P. **Radiological Appearance in the Lung Fields of Tropical Eosinophilia.** *Calcutta Med. J.* 1960, May, v. 57, No. 5, 152–6, 7 figs. on 2 pls. [20 refs.]

This paper from Calcutta concerns itself with radiological observations on more than 400 cases of tropical eosinophilia, with the following results.

Löffler's syndrome and tropical eosinophilia, from the radiological angle, are probably one and the same thing. Scarring in the lung is rare after tropical eosinophilia. Changes in the cardiac silhouette are frequently seen in tropical eosinophilia, but they are often transitory and disappear with the remission of symptoms. Radiological changes in the lung fields, the severity of the clinical condition and the eosinophil count are not always correlated. The eosinophilic count and the severity of the symptoms wax and wane, but not so the radiological picture. Other conditions associated with tropical eosinophilia are bronchiectasis, pulmonary tuberculosis, emphysema and atelectasis. Emphysema often arises as a complication. Lung findings tend to reappear with recurrence of symptoms after a remission lasting months or even years.

[There are 7 figures of reproductions of radiographs, but these convey little positive information.] [See also this *Bulletin*, 1955, v. 52, 834.]

Philip Manson-Bahr

Webb, J. K. G., Job, C. K. & Gault, E. W. **Tropical Eosinophilia. Demonstration of Microfilariae in Lung, Liver, and Lymph-Nodes.** *Lancet.* 1960, Apr. 16, 835–42, 10 figs. [20 refs.]

At the Christian Medical College, Vellore, southern India, children with 4,000 eosinophils per cmm. were investigated. 5 children with typical lung infiltration and moderate hepatomegaly had open liver biopsy, and liver biopsy was done on another child with enlarged liver and spleen, and on a child with enlarged lymph glands but no lung involvement. One child was admitted specifically for lung biopsy and one lung resected from an adult in 1950 was available for pathological study. A lung was removed from a patient with a tension cyst of the lung and a child was admitted for the surgical cure of a patent ductus arteriosus. Lymph-node biopsy was later done in 12 patients, 9 with pulmonary infiltration and 3 with no pulmonary involvement.

In the lung tissue there was oedema of the alveolar wall, and scattered nodules formed areas of consolidation in which the alveoli were distended with eosinophils and fibrin. Portions of microfilariae were found in the centre of some of them. Some nodules had progressed to epithelioid and giant cells surrounding hyaline material. In 5,000 serial sections 5 almost complete microfilariae were found, one in the lung resection 10 years before, 3 in the lung resected for a tension cyst, and one in the child admitted for his biopsy.

In the liver biopsies whitish nodules were found, giant cells were surrounded by epithelioid cells and eosinophils, and in some 3,000 sections examined one almost complete microfilaria was found in the centre of one of the aggregates of eosinophils in one of the biopsies.

In the lymph-node biopsies there were aggregations of eosinophils in the medullary cords and lymph sinuses, among which microfilariae could be seen, which could have been those of *Wuchereria bancrofti*. It is suggested that the microfilariae are responsible for the lesions. Clinical notes are given of 10 patients and these are fully discussed and the findings illustrated by photomicrographs. [For an earlier study by these workers, see this *Bulletin*, 1957, v. 54, 1471.] *W. E. Kershaw*

BHARGAVA, H. S. & KHANDELWAL, M. K. **Treatment of Tropical Eosinophilia with Diethyl-Carbamazine Citrate in Children (Single Dose Oral Therapy).** *Indian J. Child Health.* 1961, Feb., v. 10, No. 2, 101–7. [12 refs.]

Treatment with single dose (oral) therapy in tropical eosinophilia is desirable. After an initial successful trial with single oral dose therapy (16 mgm./kgm. body weight) in 30 adults suffering from tropical eosinophilia, a similar trial was undertaken in children in Nagpur. The criteria used in selection of patients for trial were (i) symptoms and signs suggestive of tropical eosinophilia, (ii) an absolute eosinophil count of 2,000 per cmm. or more, (iii) exclusion of other conditions associated with a high eosinophil count.

20 cases were studied—16 boys and 4 girls in ages from 3–12 years. The duration of illness varied from less than 7 days to a maximum of 2 years. The total leucocyte count varied from 8,000 to 28,000 per cmm. and the absolute eosinophil count from 2,000 to 20,000.

Diethylcarbamazine syrup in a single dose of 16 mgm./kgm. body weight was given orally half an hour after evening meals. The drug was well tolerated and no side effects were noted in any case.

The value of diethylcarbamazine in the treatment of tropical eosinophilia has been well established. 15 patients got complete relief in 7–12 days. Only one patient showed none. *Philip Manson-Bahr*

HENDERSON, F. W. **Tick Paralysis. Report of a Case in Florida.** *J. Amer. Med. Ass.* 1961, Feb. 18, v. 175, No. 7, 615–17.

PARASITOLOGY: GENERAL

OELLERMANN, Ilse, HENNESSY, Esmé & ELSDON-DEW, R. **A Comparison of Various Techniques for the Parasitological Examination of Faeces.** *South African J. Lab. & Clin. Med.* 1960, Dec., v. 6, No. 4, 247–51, 1 fig.

66 specimens of faeces were examined by 6 different methods for the presence of parasites. The six methods used were direct examination of a saline preparation, zinc sulphate concentration, direct examination of a specimen in "MIF", "MIFC" concentration, examination of a smear fixed in polyvinyl alcohol mixture and stained with haematoxylin (PVAH) and examination of a PVA preparation stained by Gomori's method (PVAG).

For protozoal parasites PVAG gave the best results, showing 78% of the total found by all methods, followed by PVAH (68%) MIFC (52%), MIF (52%), direct saline (45%), and zinc sulphate (38%).

For metazoal parasites the order of efficiency showed an almost complete reversal, the zinc sulphate being best (77%) followed by MIFC (61%), direct saline (53%), MIF (27%), PVAG (3%) and PVAH (2%).

The best combination of two techniques to cover all parasites was zinc sulphate and PVAG but even this gave only 81%.

It is stated by the authors that it is impossible to make a firm recommendation for a system of two techniques, and a triple technique is imperative. They go on to suggest that, taking simplicity of preparation into consideration, possibly the best combination would be direct saline, zinc sulphate and PVAG.

[The value of this paper would have been greater if some details had been given on exactly how the examinations were made, *e.g.*, did the same person carry out all six methods on any one specimen, or did one person do all the direct saline tests, and another all the zinc sulphate methods, etc.

It would also have been instructive if each specimen had been examined several times by each method, to see what increase in positives this would have produced.] *W. P. Stamm*

ROBINSON, J. J. **Two Cases of Pneumocystosis. Observation in 203 Adult Autopsies.** *Arch. Pathology.* 1961, Feb., v. 71, No. 2, 156–9, 6 coloured figs. on pl.

"Two out of 203 adult postmortem examinations showed Pneumocystis carinii infection. Both were in debilitated young Negro men. This infection is not commonly encountered in the terminal bronchopneumonia associated with malignancies and degenerative diseases in adults. Lung impression smears stained with Wright's stain facilitated the diagnosis of this disease."

MACKERRAS, M. Josephine & MACKERRAS, I. M. **The Haematozoa of Australian Birds.** *Australian J. Zool.* 1960, Aug., v. 8, No. 2, 226–60, 27 text figs. & 42 figs. on 4 pls. [Numerous refs.]

The protozoal parasites of the blood of the Australian vertebrates are being described in a series of monographs by Dr. and Mrs. Mackerras [this *Bulletin*, 1959, v. 56, 984]; this number is devoted to the avian forms, and reviews 4

species of trypanosomes (including a new species *T. myzanthae* from the soldier-bird), 7 species of *Haemoproteus* and unidentified varieties from 29 kinds of birds, 5 species of *Leucocytozoon* and unidentified varieties from 8 bird hosts, and 2 species of *Lankesterella* (including a new species *L. picumni* from the tree-creeper). Malaria parasites are less common than the other blood parasites; they include the cosmopolitan *Plasmodium relictum*, the local *P. biziurae* of ducks, and 2 parasites of doubtful identification in falcons and gulls. In only a few cases is confirmation available about the stages of the parasites in the invertebrate hosts. *P. C. C. Garnham*

ENTOMOLOGY AND INSECTICIDES: GENERAL ZOOLOGY

[Papers on the toxic effects of insecticides in man are abstracted in the *Bulletin of Hygiene* under the general heading of Occupational Hygiene.]

COMMISSION FOR TECHNICAL CO-OPERATION IN AFRICA SOUTH OF THE SAHARA. Publication No. 29. **The Cartography of Vectors of Disease, Bukavu–Lwiro, 1957.** 65 pp., 1 fig. 1958. London: 43, Parliament Street, S.W.1. Bukavu: B.P. 949, Belgian Congo.

This meeting of the Commission considered in fairly general terms the preparation of maps of vectors of disease in Africa south of the Sahara, recognizing the need to integrate any new activities in this direction with existing efforts by institutes or individual people. There are very brief reports of informal discussions about points to be borne in mind for a few vector groups. Representation on the Commission was insufficient to cover all aspects of the subject. In appendix form, Dr. D. H. S. DAVIS contributes an account of mapping methods and maps (some published) at the Medical Ecology Centre of South Africa; Dr. G. THEILER provides a useful reference list to the numerous published maps on ticks of Africa, with critical notes on their accuracy; there are short contributions by others about tsetse maps, and about symbols for anophelines. *D. S. Bertram*

LEWIS, D. J. **Medical Entomology in the Sudan Republic.** Reprinted from *Sudan Notes & Records*. 1958, v. 39, 11–24. [Numerous refs.]

This paper reviews the insects and other arthropods of the Sudan, other than the Diptera, Coleoptera and Hemiptera [this *Bulletin*, 1958, v. 55, 1179, 1180], that affect man more or less directly. It also provides a guide to the literature on the medical entomology of the Sudan. The main sections of the paper are devoted to the Hymenoptera, Siphonaptera and Arachnida.

The known distribution of *Pediculus humanus, Phthirus pubis, Tunga penetrans, Pulex irritans, Xenopsylla cheopis, Ornithodoros moubata, O. savignyi, Rhipicephalus sanguineus, Sarcoptes scabiei* and trombiculid mites in the Sudan are given here, but in addition, there is a great deal of interest in the numerous records of less well known animals, from soldier termites used to suture wounds to *Ornithonyssus* mites biting man, which should be consulted in the original paper.

The references usefully cover the previous literature on these " other " orders of arthropods affecting man. *B. R. Laurence*

LAIRD, M. **Parasites of Singapore Mosquitoes, with particular reference to the Significance of Larval Epibionts as an Index of Habitat Pollution.** Reprinted from *Ecology*. 1959, Apr., v. 40, No. 2, 206–21, 13 figs. [Numerous refs.]

In the course of a detailed account of the parasites found on or in mosquito larvae collected around Singapore airport, the author recorded *Anopheles sundaicus* and *Culex sitiens* from brackish surface water. *Culex pipiens fatigans, Aedes albopictus* and *A. aegypti, Uranotaenia nivipleura* and *Armigeres obturbans* are container breeders, though *C. p. fatigans* is also found in surface waters. The remaining species found are listed. They are primarily surface water breeders, though *C. fuscanus, C. fuscocephalus* and *C. tritaeniorhynchus summorosus* [this *Bulletin*, 1957, v. 54, 1135] are sometimes found in the larger type of simple container.

The most highly polluted waters with vigorous decomposition (polysaprobic) supported *C. p. fatigans* and *A. obturbans*. In surface waters of a lesser degree of pollution (α-mesosaprobic) characterized by the presence of amino acids, *Anopheles kochi, C. annulus, C. p. fatigans, C. fuscanus, C. fuscocephalus, C. gelidus* and *C. t. summorosus* were dominant. Surface waters of the next lower degree of pollution (β-mesosaprobic, characterized by ammonia compounds of fatty acids) supported most of the species found, except *A. obturbans, C. gelidus* and *C. p. fatigans. Anopheles hyrcanus, Ficalbia metallica* and *Mansonia uniformis* reached their peak in β-mesosaprobic waters. The container breeders *A. albopictus* and *U. nivipleura* developed equally well in both mesosaprobic zones.

The author concludes that the various organisms found growing upon the larvae (epibionts) were not true mosquito parasites; the larvae, as suitable substrates, had simply become infested with epibionts characteristic of the habitat and degree of pollution. Some of these epibionts, such as the sewage bacteria, *Sphaerotilus natans* and *Zoogloea ramigera*, are of some value as biological indicators in mosquito surveys, their occurrence upon larvae pointing to highly polluted conditions; other examples are given. *J. A. Reid*

CORLISS, J. O. **Natural Infection of Tropical Mosquitoes by Ciliated Protozoa of the Genus** *Tetrahymena*. *Trans. Roy. Soc. Trop. Med. & Hyg.* 1961, Mar., v. 55, No. 2, 149–52, 3 figs. (2 on pl.) [12 refs.]

Species of *Tetrahymena* have now been recorded as facultative parasites of a wide range of animals, both vertebrate and invertebrate (CORLISS, *Parasitology*, 1960, v. 50, 111). This paper draws attention to their occurrence in tropical mosquitoes which are usually killed by the infections; the possibility that this might be put to practical use seems worth exploring.

Tetrahymena stegomyiae (Keilin) was first recorded from larvae (probably *Aedes albopictus*) in Malaya [this *Bulletin*, 1922, v. 19, 113], and later from a number of tree-hole breeding mosquitoes in Rhodesia (MUSPRATT, *J. Entom. Soc. S. Afr.*, 1945, v. 8, 13). Recently a *Tetrahymena* species has been recorded

from mosquito larvae in Singapore [LAIRD, above], while from Malaya the author has received material of a curious polymorphic species (? *Tetrahymena*) which infects larvae and adults of certain species of *Armigeres* that breed in living bamboos. *J. A. Reid*

KREMER, M. Sur quelques Culicides de Guinée. **[Some Mosquitoes of Guinea]** *Ann. Parasit. Humaine et Comparée.* 1960, July–Sept., v. 35, No. 4, 615–18, 1 fig.

In the rainy season (July–August) 1959, the author collected a number of mosquito larvae and adults in Guinea, mostly in Fria and Conakry. Some of them do not appear to have been recorded in this area before.

The species found were *Anopheles squamosus, Culex pipiens fatigans, C. annulioris, Aedes aegypti, Aedes vittatus, Aedes luteocephalus, Aedes fraseri, Aedes apicoargenteus.* *H. J. O'D Burke-Gaffney*

KELLETT, F. R. S. & GILKES, C. D. **Preliminary Tests with a New Insecticide (Baytex) on Adults and Larvae of** *Culex fatigans* **and** *Aedes aegypti.* *West Indian Med. J.* 1960, Sept., v. 9, No. 3, 201–6.

The tests were done in the laboratory with a colony of *Culex pipiens fatigans,* which was shown to be resistant to dieldrin and difficult to kill with BHC or DDT, by WHO and Busvine-Nash tests. Exposure to Baytex residues at 0·1 gm. per sq. m. for 15 minutes or 1 gm./m.^{2} for 2 minutes killed all adults (both residues apparently on sprayed boards). Tests with the larvae gave 99% kill after 24 hours exposure to 0·01 p.p.m. of Baytex suspension. Other tests were done with DDT resistant adults and larvae of *Aedes aegypti.* Baytex residue at 1 gm./m.^{2} also gave complete kills 24 hours after a 2-minute exposure. The larval kill, after 24 hours in 0·01 p.p.m. suspension, was 99·5%. At this rate, suspensions or emulsions of trichlorphon (Dipterex) or malathion gave less than 1% kill, BHC killed only 16% and parathion 75%.

These results support earlier papers on the promise of the organo-phosphorus compound, Baytex. [See CERF and LEBRUN, this *Bulletin*, 1960, v. 57, 80; COVA GARCÍA and SUTIL, *ibid.*, 85; JUNG, *ibid.*, 426; SCHRADER, and JUNG *et al.*, *ibid.*, 1232.] *J. R. Busvine*

CURTIN, T. J. & JONES, J. C. **The Mechanism of Ovulation and Oviposition in** *Aedes aegypti.* *Ann. Entom. Soc. of America.* 1961, Mar., v. 54, No. 2, 298–313, 7 figs. [Numerous refs.]

HADDOW, A. J., CORBET, P. S. & GILLETT, J. D. **Laboratory Observations on the Oviposition-Cycle in the Mosquito** *Aëdes (Stegomyia) apicoargenteus* **Theobald.** *Ann. Trop. Med. & Parasit.* 1960, Dec., v. 54, No. 4, 392–6, 2 figs. [18 refs.]

Oviposition is diurnal in *Aedes aegypti* and *A. africanus* [this *Bulletin*, 1958, v. 55, 106 *bis*], but nocturnal in *Mansonia fuscopennata* [*ibid.*, 1959, v. 56, 370]. Work in the laboratory with *A. apicoargenteus* shows this species to resemble the

other two *Aedes*—all of the subgenus *Stegomyia*—in having a diurnal oviposition rhythm. Most eggs are laid between 10 and 14 hours. For these three *Aedes* species, the peak of oviposition precedes the peak period for biting, this being particularly clear for *A. aegypti* and *A. africanus*, the authors here confining themselves to data for *A. aegypti formosus* (the " wild " dark form), which they regard as the primitive forest form and suitable for comparison with these two other wild, forest species of *Aedes*. In discussion of literature and unpublished data it seems that *A. apicoargenteus* tends to lay in tree holes in the higher levels of the forest and oviposition from the mid-morning to early afternoon may indicate selection by sight during maximal sunlight.

Opportunity for a daily blood meal (guineapig), and a bamboo section lined with filter paper and containing filtered tree-hole water, appear to be important for inducing good oviposition by *A. apicoargenteus* in the laboratory.

D. S. Bertram

FAIRCHILD, G. B. & HERTIG, M. **Notes on the *Phlebotomus* of Panama. XVI (Diptera, Psychodidae). Descriptions of New and Little-Known Species from Panama and Central America.** *Ann. Entom. Soc. of America.* 1961, Mar., v. 54, No. 2, 237–55, 9 pls. [15 refs.]

SCORZA, J. V. & ORTIZ, I. **On Microclimatic Conditions of the Habitats of Certain Sandfly Species (Diptera, Psychodidae) from Venezuela.** *Ztschr. f. Tropenmed. u. Parasit.* Stuttgart. 1960, v. 11, No. 4, 433–40, 5 graphs. [Numerous refs.]

The sandfly fauna of uninhabited forest in Venezuela is described and related to the conditions of temperature, humidity and vegetation found at different altitudes. Of the 11 species recorded, 5 were found only between 550 and 860 metres, 3 were found only between 750 and 1,175 metres and 3 were found at catching stations between 550 and 1,175 metres. The microclimates of animal burrows in which sandflies were found are described. Conditions in the burrows were generally similar to conditions outside, but variations of temperature and humidity in the burrows were generally less extreme. *Phlebotomus shannoni* and *P. ovallesi* have been captured feeding on human blood. *B. R. Laurence*

WILLIAMS, T. R., CONNOLLY, R., HYNES, H. B. N. & KERSHAW, W. E. **Size of Particles ingested by *Simulium* Larvae.** [Correspondence.] *Nature.* 1961, Jan. 7, v. 189, 78.

The authors, from the Liverpool School of Tropical Medicine and the Department of Zoology, University of Liverpool, point out that while the diets of the aquatic larval stages of *Simulium* species have been described, there is little available information on the size of the particles ingested. They have therefore measured the particulate matter ingested by the larvae of 4 temperate species of *Simulium* obtained in groups from a river and streams in 3 areas in North Wales. The species are named and the sources described. Contents of the midgut, separated from the gut tissue on a slide, were spread by pressure on a coverslip and the longest and shortest axes of 45 particles selected at random were

measured in the 5 last instar larvae of each group: 5 earlier instar larvae which were not identified were also measured.

It was found that the frequency distribution of particle sizes was log normal in each group and sizes of individuals of each species were similar. Detailed measurements are given for each sample and area. The largest axes varied from 11·3 ± 1·8 to 15·1 ± 2·0 μ and the shortest from 6·6 ± 1·7 to 8·0 ± 1·8 μ.

H. J. O'D. Burke-Gaffney

HYNES, H. B. N. **A Plea for Caution in the Use of DDT in the Control of Aquatic Insects in Africa.** *Ann. Trop. Med. & Parasit.* 1960, Oct., v. 54, No. 3, 331–2. [11 refs.]

The author presents a well documented argument in favour of a more cautious approach to the control of aquatic insects with DDT. Particular reference is made to the control of *Simulium* in Africa. The control of *Simulium* with DDT has been successful in parts of Africa [GARNHAM and MCMAHON, this *Bulletin*, 1954, v. 51, 821] but the insecticide must also kill other animals and cause disruption of the ecological balance of the animal community in the water. The natural enemies of *Simulium* (stone-flies and caddis worms) are known to be severely affected by DDT (HOFFMAN and DROOZ, *Amer. Midland Naturalist*, 1953, v. 50, 172 and HOFFMAN and MERKEL, *J. Econom. Entom.*, 1948, v. 41, 464). It is feared that if *Simulium* recolonizes treated areas before its enemies, a catastrophic outbreak of this insect might result. The possibility of this actually occurring can ony be assessed from a study of the biology of African streams. The necessity of such study is strongly urged.

The author suggests that *Simulium* could possibly be controlled by insecticides without too much danger to other animals if the poison could be applied in the form of insoluble suspended solids. This procedure recognizes the fact that *Simulium* is one of the few stream animals which is a particle feeder [see FREDEEN *et al.*, this *Bulletin*, 1953, v. 50, 769].

B. C. Fine

LEVINSON, Z. H. **Food of Housefly Larvae.** [Correspondence.] *Nature.* 1960, Oct. 29, v. 188, 427–8, 1 fig.

House-fly larvae breed in a variety of materials, all of which appear to have dense microbial floras. In the laboratory, culture methods for larvae include yeast added to a base of either wheat bran, oats, or grass meal, etc. More uniform growth of larvae, however, has been achieved by replacing the yeast by a controlled bacterial flora [SILVERMAN and SILVERMAN, this *Bulletin*, 1953, v. 50, 1089] although *living* micro-organisms are not necessary for larval growth [GREENBERG, *ibid.*, 1956, v. 53, 1493].

Escherichia coli is one of the dominant micro-organisms found in larval breeding sites and experiments in which this bacterium is used in larval diets are described in this paper.

The main experimental diet consisted of 40% wheat bran, 2·5% milk powder and 57·5% water, to which *E. coli* (laboratory strain) was added at approximately 4×10^4/gm. medium. Batches of the experimental diet were allowed to incubate for varying periods, after which they were autoclaved. Newly hatched larvae of

Musca d. vicina were then introduced into the diets at a rate of 1 larva/gm. larval medium. The results, illustrated graphically, indicate that those diets with a short incubation period did not support larval growth. Larval growth was optimal in diets which had been incubated for approximately 72 hours to give a bacterial concentration of 8×10^8/gm. diet just before sterilization. Evidence is presented to show that the nourishment provided by *E. coli* arises from the nature of its cell contents rather than the products of its metabolic activity.

A second series of experiments further demonstrated the highly nutritious value of *E. coli* to larvae. Diets containing water, powdered filter paper, cholesterol and varying amounts of dried bacteria were set up under aseptic conditions. Newly-hatched larvae were introduced into these diets and it was found that the weight of the larvae after 72 hours increased proportionately to the percentage of *E. coli* in the diet. Diets containing 2·3%, 4·8%, 9·1% and 12·0% *E. coli* produced larvae weighing an average of 1·4, 10·8, 20·6 and 21·0 mgm. respectively. 72-hour-old larvae from an enriched synthetic medium weighed only 14·8 mgm. The 12·0% *E. coli* diet was also superior in allowing more larvae to reach the adult stage successfully.

The results show that, apart from water and cholesterol (in which *E. coli* seems to be lacking), *E. coli* appears to contain all the requirements for healthy larval development. Attention is drawn to the fact that *E. coli* contains a protein which is of greater nutritional value to house-fly larvae (Brookes and Fraenkel, *Physiol. Zool.*, 1958, v. 31, 208; House and Barlow, *Ann. Entom. Soc. of America*, 1958, v. 51, 299) and other animals (Roberts, *Brit. J. Nutrition*, 1954, v. 8, 353) than conventional animal proteins.

The author concludes by suggesting that the variety of materials on which larvae thrive in nature are only substrates for bacteria which are probably the actual larval foods. He also suggests, with good reason, that desiccated *E. coli*, together with suitable supplements, could be used as a standard rearing medium for the laboratory culture of house-flies. *B. C. Fine*

Plapp, F. W., Jr. & Bigley, W. S. **Inhibition of House-Fly Ali-Esterase and Cholinesterase under *in vivo* Conditions by Parathion and Malathion.** *J. Econom. Entom.* 1961, Feb., v. 54, No. 1, 103–8, 3 figs. [10 refs.]

"Ali-esterase (Ali-E) in adult female house flies (*Musca domestica* L.) was rapidly inhibited *in vivo* following treatment with parathion or malathion. When dosages were such that some or all of the insects survived the insecticide treatment, levels of Ali-E activity returned to normal within 24 hours. The observed patterns of inhibition were similar with both insecticides and did not appear to be directly related to their toxic action. Cholinesterase activity was more slowly and less reversibly inhibited and the inhibition was closely correlated with the observed symptoms of poisoning. Patterns of inhibition of both esterases were similar in strains of flies resistant and susceptible to parathion." [See this *Bulletin*, 1960, v. 57, 761, 1229.]

Georghiou, G. P., Metcalf, R. L. & March, R. B. **The Development and Characterization of Resistance to Carbamate Insecticides in the House Fly, *Musca domestica*.** *J. Econom. Entom.* 1961, Feb., v. 54, No. 1, 132–40, 4 figs. [26 refs.]

TIPTON, V. J. & MENDEZ, E. **New Species of Fleas (Siphonaptera) from Panama.** *Ann. Entom. Soc. of America.* 1961, Mar., v. 54, No. 2, 255–73, 10 pls.

LOOMIS, E. C. **Life Histories of Ticks under Laboratory Conditions (Acarina: Ixodidae and Argasidae).** *J. Parasitology.* 1961, Feb., v. 47, No. 1, 91–9, 8 figs. on 2 pls. [28 refs.]

PARRISH, D. W. **The Ticks (Argasidae and Ixodidae) of Turkey.** *J. Econom. Entom.* 1961, Feb., v. 54, No. 1, 91–2, 1 fig.

"Based on data gathered over a 13-month period, beginning in 1958, 19 species, representing 8 genera of ticks, are listed as occurring in Turkey. These include 5 *Haemaphysalis* species, 5 *Hyalomma*, 2 *Argus*, 2 *Boophilus*, 2 *Rhipicephalus*, 1 *Dermacentor*, 1 *Ixodes*, and 1 *Ornithodoros*. The physical features of Turkey are briefly described and a map is presented showing the four topographical areas into which the country may be divided. Areas in which each tick species occurs are shown opposite the species listed. Six species have been incriminated in the transmission of animal diseases in Turkey."

DA FONSECA, F. Notas de Acarologia. XLVI. Acarofauna zooparasita na Bolívia. [**Notes on Acarology XLVI. Zooparasitic Acarofauna in Bolivia**] *Mem. Inst. Butantan.* 1959, v. 29, 89–141, 21 figs. [15 refs.] English summary.

JOHNSON, Phyllis T. **The Sucking Lice (Anoplura) of Egypt. I. Species infesting Rodents.** *J. Egyptian Pub. Health Ass.* 1960, v. 35, No. 6, 203–28, 73 figs. & 1 map on 16 pls. [20 refs.]

GEORGHIOU, G. P. & METCALF, R. L. **Synergism of Carbamate Insecticides with Octachlorodipropyl Ether.** *J. Econom. Entom.* 1961, Feb., v. 54, No. 1, 150–52, 1 fig.

WORLD HEALTH ORGANIZATION. TECHNICAL REPORT SER. No. 206. **Aircraft Disinsection. Eleventh Report of the Expert Committee on Insecticides. Geneva, 19–24 September 1960.** 26 pp. [Refs. in footnotes.] 1961. Geneva: Palais des Nations. [Sales agent for U.K., H.M. Stationery Office.] [1s. 9d.; $0.30; Sw.fr. 1.–.]

This report should be obtained by anyone concerned with insect quarantine problems of public health importance. It is not possible to abstract the already condensed information and recommendations given by the Committee, which comments on the difficulties of ensuring the proper conduct of quarantine

measures at airports. One possible development mentioned is the use of DDVP (O,O-dimethyl O-(2,2-dichlorovinyl) phosphate) for " vapour disinsection " while the aircraft is in the air. *B. R. Laurence*

LABORATORY PROCEDURES

SHUTE, P. G. & MARYON, M. **A Satisfactory Technique for Storing and Staining Malaria and other Parasites in Old Blood Films.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1960, Sept., v. 54, No. 5, 415–18, 20 coloured figs. on pl.

The staining of stored thick and thin blood films for malaria parasites has always presented a problem, and the authors of this paper describe a method which has proved satisfactory for periods of storage up to 3 years. Thick and thin films are dried and packed without fixation and without wrapping in the ordinary slide boxes of the manufacturers. The box is placed in a desiccator, which is kept in a refrigerator. When required the desiccator is removed and kept standing for an hour or two before the seal is broken; the slides are then removed and stained by any of the Romanowsky methods, though the authors prefer the Giemsa-saline method (with 0·8% sodium chloride buffered to *p*H 7·4 instead of distilled water as the diluent, and prolonging staining for one hour). A coloured plate illustrates the efficiency of this method. If films are not stored in this way, it is best to stain thin films unfixed, and with Giemsa's stain; thick films are quite unstainable. *P. C. C. Garnham*

MISCELLANEOUS PAPERS

WIGGINS, C. A. **Early Days in British East Africa and Uganda.** *East African Med. J.* 1960, Nov. & Dec., v. 37, Nos. 11 & 12, 699–708; 780–93.

The author of this entertaining article joined the Medical Department of the British East Africa Protectorate in 1901. He held various posts in Kenya and Uganda, became Principal Medical Officer in Uganda, and retired in 1922. As can be imagined, his reminiscences of life and work during those 20 years of service include experiences which throw the rate of development of the East African territories into sharp perspective. In 1901, Dr. Wiggins possessed the only microscope in the Protectorate; he had to pay Customs duty of 30% of its value when he imported it, but extracted a refund when plague broke out in Nairobi some months later. In the same year, he was posted to Kisumu, where he found the Kavirondo " stark-naked save that the women wore a tail of maize fibre, very neatly made and ornamented with small beads ". In addition to lively sketches of personalities (including members of the Sleeping Sickness Commissions), there are first-hand accounts of events which read curiously in 1961; these

include supervision of an execution by shooting, a remarkable instance of multiple deaths from witchcraft, and a vivid description of the only survivor of punitive mutilation inflicted on 13 people who were suspected of having stolen 3 of the Kabaka's cattle.

This article should be illuminating to many who are unaware of the conditions under which medical men worked in East Africa 60 years ago.

R. S. F. Hennessey

FORD, E. **The Life and Influence of Joseph Bancroft, M.D.** [The Bancroft Memorial Lecture.] *Med. J. Australia.* 1961, Feb. 4, v. 1, No. 5, 153–70, 14 figs. [Numerous refs.]

REPORTS AND SURVEYS

OOMEN, H. A. P. C. **The Papuan Child as a Survivor.** *J. Trop. Pediatrics.* London. 1961, Mar., v. 6, No. 4, 103–21, 10 figs. [21 refs.]

New Guinea is a wild, partly swampy, partly mountainous country with an extremely primitive population living in scattered small villages; the existence of some communities has become known only during the last 25 years. Villages have populations of about 60 inhabitants living by subsistence agriculture, without wheeled transport, trade, barter, or use of currency. There are differences in staple foods, and in the incidence of malaria in different villages. These conditions have provided an opportunity to study the health and survival of the child of primitive man, lacking all the conventional amenities.

The dietary intakes of pregnant and lactating women in 5 villages in typical primitive environments were studied, and compared with those found in an oil settlement where rations provide canned foods and milk. In the primitive villages, daily intakes varied from 1,170–1,490 calories, 4–20 gm. of vegetable protein, 0–11 gm. animal protein, 1·1–2·1 protein gm./100 cal., 0·3–0·7 protein gm./kgm. bodyweight. Staples were sago, taro, sweet potato, and yam; 2 intakes were wholly vegetarian; 2 had over 90% of staple—sago and sweet potato—and 2 had 71% and 80% of taro; pulses were not used. Three of these diets are among the lowest intakes so far described in free populations, but pregnant and lactating women apparently subsist and meet their energy needs on these without harm.

Daily work for the mother may entail carrying a 20 kgm. load (including a child) over two miles of hilly country. If 50% calories above basal metabolism are allowed for energy expenditure, basal metabolism would be 800–1,000 calories. This is 20–30% less than values calculated on a conventional height/weight formula. Apparent "laziness" alternates with heavy work and the general pace of activity is slow. It is estimated that the average mother has pregnancies leading to 5–7 live births and that for over 15 years she is either pregnant or lactating, or both. Lactation continues for up to 4 years. Average milk yields of 310–480 ml. per day at 6–12 months were maintained at up to 300 ml. for 2–3 years in women in some areas, and might continue for 4 years, but in women in the worst-fed area lactation ceased after 18 months. A woman

may contribute from 4–7 gm. of protein to her milk (depending on milk quality) out of her daily intake of 15–20 gm. for a period of about 2 years. Haemoglobin values were low in the worst-fed areas, but there was coincident malaria; variations in serum proteins did not exceed the normal range.

There was variation in weaning practices in different areas. 50% of infants in some areas were still being suckled at the age of 2 years and the proportion was higher in others. Young babies are fed on demand, there is seldom a sudden suspension of breastfeeding, and supplementary foods may be introduced from the earliest months. Weaning is predominantly on to the starchy staple foods, and, from 2–6 years, dietary intakes averaged 550–950 cal. and 5–27 gm. protein in the different areas. The lowest values recorded indicate 40 calories and 0·7–0·9 gm. protein/kgm. bodyweight. As elsewhere, the dependent toddler at 2 years old had the worst diet, and the older toddler and school-age child had relatively greater protein consumption per kgm. weight. Weight increase is similar to that in European babies during the first 3–6 months; retardation in weight increase compared with Europeans starts between 3 and 6 months and may be related to maternal diet; the resulting toddler is smaller and lighter than Caucasian counterparts.

Serum albumin observations in 12 different groups show means ranging from 3·0–3·7 gm.%, one other group having a mean of 2·5 gm.%. That these are not lower values, considering the very low protein intakes in some areas, is remarkable. Though serious malnutrition cases—marasmus, kwashiorkor, xerophthalmia, rickets, goitre and cretinism—are not rare in the poorly fed regions, other children, while showing a number of marginal signs of malnutrition, are comparable in general clinical condition with their counterparts in affluent societies. They are often thin with low bodyweights and small muscles, their skin is hard, dry and thin, and they commonly show enlargement of the parotids and of the liver, but these signs do not seem to interfere much with their vitality. They are the survivors of an extremely limited diet in the second half of the first and the whole of the second year, and to all appearances their chances of further survival are not bad. Selection of the genetically fit must be most active in these surroundings, and it is possible that the borderline symptoms noted in the survivors indicate an adaptation to a harsh environment rather than an undesirable pathology. *T. P. Eddy*

GAST GALVIS, A. Una década de labor del Instituto Carlos Finlay de Colombia. [**A Decade of Activity of the Carlos Finlay Institute, Ministry of Public Health, Colombia**] *Bol. Oficina Sanitaria Panamericana.* 1961, Jan., v. 50, No. 1, 44–58, 7 figs. English summary.

Jungle yellow fever was first detected in Colombia in 1933 and a "Section for Special Studies" was set up to investigate it. From this the Carlos Finlay Institute in Bogotá eventually developed, acquiring its present name in 1944. From the beginning, investigations were carried out in cooperation with the Rockefeller Foundation: from 1948 to 1949 the Institute functioned under the Ministry of Public Health and in 1950 an agreement was arrived at between the Ministry and the Pan American Sanitary Bureau (the regional office of WHO for the Americas) whereby the Bureau gives financial and technical assistance to the Institute. A programme was inaugurated to include a viscerotomy service, production, distribution and use of yellow fever vaccine, epidemiological studies

and laboratory and field studies of other arborviruses. The agreement also included responsibility by the Institute for the campaign to eradicate *Aedes aegypti*; this was later modified and from 1952 to 1956 this service was undertaken by the Servicio Cooperativo Interamericano de Salud Pública, but from 1957 the Institute took it over again.

This report covers the years 1950–1959 in respect of all these activities. Many of the studies have been published and readers of this *Bulletin* will be familiar with them. The following points are of special interest.

During the period under review nearly 17 million doses of 17D yellow fever vaccine have been prepared, of which more than 40% is distributed to other countries. In Colombia itself some 2·5 million doses were issued and 65% of these were actually used for vaccination. At the end of the year, more than half a million doses were held for emergency use. Most of the vaccine had been given subcutaneously, but since 1957 studies have been proceeding on the application of 17D vaccine by scarification. Early reports indicated success rates of 98% and field trials were therefore made with a high titre vaccine which could be maintained in the field for a week or two without loss of titre. Such a trial involving some 3,397 persons is still being evaluated.

During the decade 40,886 viscerotomy specimens of human liver have been examined and 672 were positive for yellow fever of the jungle type. This service has enabled the areas of yellow fever in Colombia to be delineated. Incidentally, viscerotomy has been instrumental in the discovery of visceral leishmaniasis and histoplasmosis in Colombia, in drawing attention to the presence of sickle-cell anaemia and the absence of *Schistosoma mansoni* infection (despite its prevalence in the neighbouring territory of Venezuela) and has been valuable in malaria studies.

Field epidemiological studies were made to detect antibody to yellow fever and other arborviruses in the blood of man, monkeys and birds. In San Vicente de Chucurí, where the most detailed study was made, 75% of 1,285 persons were found to have yellow fever antibodies, and antibodies were also found to Venezuelan equine encephalitis, Mayaro, dengue, Ilhéus, St. Louis and Guaroa viruses. Antibodies to various arborviruses were also found in human sera from other areas and from sera of primates.

In 1958–1959, 678 pools of some 40,000 mosquitoes captured in San Vicente de Chucurí were examined by intracerebral inoculation of mice. Only a small proportion of the mosquitoes were *Haemagogus*. Yellow fever virus was not isolated, but Mayaro virus was isolated 4 times from *Psorophora ferox* and *P. albipes*. Ilhéus virus 3 times from *P. ferox*, Venezuelan encephalitis virus twice from *P. ferox* and twice from *Culex* sp. and another group B virus, classified as Bussuquara, is also mentioned. A few arborviruses were also isolated from man, mainly in diagnostic studies.

As a result of active measures, *Aedes aegypti*, formerly very prevalent in Colombia, was so reduced that the only area in which it was found in 1959 was the city of Cúcuta, where resistance to DDT had developed; perifocal application of dieldrin is now being tried.

This report demonstrates how a national government and an international organization can cooperate successfully in dealing with problems of importance to both. *H. J. O'D. Burke-Gaffney*

BOOK REVIEWS

LINCICOME, David Richard. [Edited by]. **International Review of Tropical Medicine. Vol. 1.** pp. xii + 300, illustrated. 1961. New York 3: Academic Press, 111 Fifth Avenue, N.Y. London: 17 Old Queen Street, S.W. 1. [$10.00.]

This is the first volume of a series in which it is designed to present aspects of tropical medicine as problems of world interest and to introduce articles on scientific and technological advances which may have fruitful applications in the tropics. In this number R. G. COCHRANE (pp. 1–42) presents "A critical appraisal of the present position of leprosy" and makes a strong plea for a world centre for the study of this disease. E. C. FAUST (pp. 43–76) writes on infection with *Entamoeba histolytica* and gives a full review of the vast bibliography on this puzzling subject. An article on history records something of the life of Patrick MANSON and his achievements as a parasitologist. It is contributed by Sir Patrick's distinguished son-in-law, Sir Philip MANSON-BAHR (pp. 77–129), who has diligently studied Manson's inspiring diaries of work carried out in isolation in China from 1870 to 1889.

Any work on tropical medicine which made no reference to malnutrition would be unbalanced. It is therefore appropriate that the next article should be an excellent review on xerophthalmia by H. A. P. C. OOMEN (pp. 131–213). "Immunochemical staining with fluorescent antibody" by MORRIS GOLDMAN (pp. 215–245) indicates how recent laboratory techniques may find a fruitful field of application in the elucidation of tropical infections even if at present they are scarcely applicable to the practice of medicine in underdeveloped areas. H. HOOGSTRAAL (pp. 247–267) reviews the extensive field of "Ticks and tick-borne diseases" of equal importance to veterinary and human medicine with zoonoses as a connecting link.

A vast mine of information is thus presented in this single volume although it does not attempt to cover more than a fraction of tropical medicine. (The 13 subjects to be dealt with in Volume 2 in 1962 are indeed listed.) The present volume, however, concludes with a timely article by C. WILCOCKS, who writes on "Sources of information on tropical medicine" (pp. 269–283). He shows how, in addition to the valuable journals devoted to tropical medicine and to journals published in tropical countries, other journals of a more general character may contain articles reporting notable progress in tropical medicine. Reference is also made to the reports of Expert Committees of WHO, and to Annual Reports of WHO and of research organizations.

This volume may be praised as a refreshingly new approach to tropical medicine. *Frederick J. Wright*

MAEGRAITH, B. G., KERSHAW, W. E. & DAGNALL, D. **Techniques in Tropical Pathology.** pp. xi + 164, 4 figs. & 6 pls. (3 coloured). 1961. Edinburgh 1: Oliver & Boyd Ltd., Tweeddale Court, 14, High Street. London: 39a, Welbeck Street, W.1. [25s.]

This book, written for medical practitioners and technicians in small laboratories, gives a comprehensive answer to many of the varied technical problems

with which they are faced. The collection of specimens and simple techniques for the examination of parasites are followed by the points of identification of the common pathogenic species. Elementary bacteriology, not so elementary haematology and a little chemistry are included besides the methods of dissecting insects and identifying snails. But the book is not arranged in this order. The first part deals with technique according to the type of specimen—blood, faeces, etc.; the second gives an account of the investigations appropriate for particular infections and the interpretation of results.

The descriptions of elementary matters and of parasitological practice are in general detailed, clear and altogether excellent. A paragraph on the fixation of faecal parasites for further examination would have been useful. Sometimes one thinks that too much has been attempted without a clear decision on which examinations should be undertaken by relatively inexperienced workers in small laboratories and which should be referred elsewhere; those with the time and skill to do so much haematology might have been trusted to find a textbook of clinical pathology; some of the instructions in bacteriology are misleading; the reference to the estimation of blood sugar, brief though it is, should have warned the reader of the need to prevent glycolysis. But these criticisms apply only to the more advanced pathology techniques.

Doctors inexperienced in tropical practice and technicians in out of the way places will find in this book a wealth of practical advice; others, examination candidates included, will find a compact source of information on diverse matters. *D. S. Ridley*

CHATTERJEE, K. D. [M.D.] **Parasitology (Protozoology and Helminthology) in relation to Clinical Medicine.** 3rd Edition. 192 pp., numerous illustrations. 1960. Calcutta 26: 6, Amrita Banerjee Road, Kalighat, India. [Rs. 18.75.]

This useful summary of human parasitology is obviously popular as is shown by the appearance of a third edition within 18 months of the second [this *Bulletin*, 1960, v. 57, 547]; the rapid progress in the subject makes it desirable for a new edition to be prepared rather than a re-issue and the author has brought the book up to date by incorporating new matter and by some re-arrangement of the text. He has also added 10 new coloured plates and 8 black and white illustrations, chiefly of parasitological life histories.

The vivid account of the effect of *Entamoeba histolytica* upon the host is still based upon the classical notion that a single pathogenic organism is involved; the parasitology of the condition is still not entirely clear, but some account of *E. hartmanni*, "minuta" types and other non-pathogenic varieties is surely desirable today.

Some revision of the account of *Toxoplasma* is necessary; for instance the specificity of the Sabin Feldman reaction is now practically confirmed, while the modes of infection should not include consumption of infected meat without some qualifying statement.

The malaria parasites are well described and illustrated; the term "para-erythrocytic schizogony" is used for the later tissue phase instead of "exo-erythrocytic schizogony"—neither term is ideal, and the new word "para-erythrocytic", denoting "alongside the red cells", is not much better than a word meaning "outside the red cells".

It is a pity that this author—like many others—persists in using the word "chromatin" when he means "nucleus".

Students of parasitology and of tropical medicine will continue to find this up-to-date book useful for quick reference. *P. C. C. Garnham*

DAVEY, T. H. [O.B.E.] & LIGHTBODY, W. P. H. [C.B.E.] **The Control of Disease in the Tropics. A Handbook for Medical Practitioners.** 2nd Edition. pp. xii + 422, 82 figs. 1961. London: H. K. Lewis & Co. Ltd., P.O. Box 66, 136, Gower Street, W.C.1. [47s. 6d.]

The first edition of this book, which appeared in 1955 [this *Bulletin*, 1956, v. 53, 949], was soon accepted as a standard textbook. Although the present revision is extensive and involves practically every chapter, the original arrangement of subject-matter has been retained. The number of pages has increased from 408 to 422; a greater increase has been avoided by omitting a few diagrams and omitting some details of the morphology of parasites and vectors. Another casualty is the map of the world.

Two new chapters have been added, on health education and poliomyelitis. The advice on health education is simple and emphasis is laid on the part to be played by members of the health department and also by teachers. Details are given of teaching aids; the specialized approach of the professional health educator is avoided. The importance of poliomyelitis as a risk to expatriates visiting the tropics is stressed but it is also noted that paralytic cases are now becoming commoner in many tropical countries; the advantages of both types of vaccine are discussed.

The chapter on malaria epidemiology has been extensively revised, largely following MACDONALD [*ibid.*, 1953, v. 50, 871], though the possibility of superinfection with the same strain of parasites is not accepted. A new section on malaria eradication has been added but the organization of a campaign with residual insecticides, and of surveillance operations, has been described less thoroughly than the classical methods of control. This may be justifiable in a handbook for medical practitioners as malaria eradication campaigns are usually in the hands of specialists. A section on the control of epidemic malaria has been added: it is a little surprising to find JSB stain omitted and that the average spleen has been preferred to the more useful average enlarged spleen.

In connexion with tuberculosis more stress is laid on the treatment of patients and the use of the Heaf test; the use of mass miniature radiography is critically assessed.

The epidemiology of leprosy has been rewritten. More weight is laid on clinical diagnosis. In the section on control of the disease emphasis on segregation has given way to mass treatment and a more liberal attitude is taken to the admission of lepromatous children to schools and to the care of infants by mothers suffering from leprosy.

The section on *Wuchereria bancrofti* and *Brugia* (previously *Wuchereria*) *malayi* has been largely rewritten. A useful table comparing filarial worms infecting man has been added.

Among many minor changes, the following were noted: the relation of low absolute humidity to epidemics of cerebrospinal meningitis is accepted; DDT in wells is advised as a temporary measure to control guinea worm; the details

of the WHO treatment policy for yaws are given; the section on arborviruses is rewritten, and in the treatment of African trypanosomiasis Mel B has been given more prominence; in that of onchocerciasis antrypol is not so strongly recommended. More emphasis is laid on the clinical diagnosis of smallpox; antivaccinial gamma globulin is advised for smallpox contacts.

In the chapter on environmental sanitation plumbosolvency is now mentioned but ozonization as a method of purification is omitted; the need for the mosquito-proofing of septic tanks is noted; aerobic and anaerobic decomposition are described and differentiated.

The appendices describing various technical procedures are retained, though extensively revised. The scratch technique is mentioned as well as multiple pressure as a method of smallpox vaccination. The determination of the age of anophelines by examination of the tracheoles and ovarioles is not described, although the former method is certainly simpler than the measurement of the ampulla, which is recommended; however, all three techniques may be considered rather too specialized for the general practitioner.

The tables of incubation periods have been corrected. Very few misprints were detected.

The book remains a straightforward description of the subject and is without a serious rival; the first edition has been rendered out of date by many important changes, of which only a few have been mentioned in this review.

M. J. Colbourne

NOTICE

Consideration has from time to time been given to the question whether it would be desirable to include authors' addresses in the headings of abstracts in the *Bulletins* and it has been decided that the additional time and cost involved would not be justified. Subscribers are advised, however, that the Bureau will, on request, notify them of the name and address of the author of the article, or the publisher of the journal, from which an abstract has been made.

The Bureau also deals with enquiries from individual subscribers relating to abstracts which have appeared in the *Tropical Diseases Bulletin* and the *Bulletin of Hygiene*; correct references and the exact nature of the information required should be stated.

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